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Part III

Consumer Product Safety Commission

Proposed Safety Standard Requiring Oxygen Depletion Safety Shutoff Systems (ODS) for Unvented Gas-Fired Space Heaters

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1212

Safety Standard Requiring Oxygen Depletion Safety Shutoff Systems (ODS) for Unvented Gas-Fired Space Heaters; Proposed Standard

AGENCY: Consumer Product Safety Commission.

ACTION: Proposed rule.

SUMMARY: The Commission proposes a consumer product safety standard that will require the application of an oxygen depletion sensor and fuel gas cutoff device (an ODS) to unvented gas-fired space heaters. At this time, such heaters permit carbon monoxide (CO) to be discharged directly into the living space, resulting in possible carbon monoxide poisoning. The ODS required by the proposed standard acts to avoid CO buildup by shutting off the supply of gas to the heater when oxygen is so depleted as to create an atmosphere hazardous to human life. Thus the proposed standard is expected to reduce the number of deaths from CO poisoning that are associated with unvented gas-fired space heaters.

DATES: (1) Effective date: The Commission proposes that any final standard for this product apply to all unvented gas-fired space heaters manufactured or imported after midnight December 30, 1980.

(2) Comments should be received by the Commission by March 18, 1980. The Commission will consider comments received after this date to the extent practicable. Interested persons will have an opportunity to make an oral presentation of data, views, or arguments regarding this proposal at a meeting on March 10, 1980, at 10:00 a.m. Those wishing to make oral presentations should notify the Office of the Secretary at (202 634–7700) by March 3, 1980. A summary or copy of testimony should be submitted to the Office of the Secretary by March 5, 1980.

ADDRESSES: Written comments, preferably in 5 copies, should be submitted to the Office of the Secretary, Consumer Product Safety Commission, Washington, D.C. 20207. All material which the Commission has that is relevant to this proceeding, including any comments which may be received on this proposal, may be seen in, or copies obtained, from the Office of the Secretary, 3rd floor, 1111 18th Street, NW., Washington, D.C. 20207. The meeting will be held in the Commission hearing room at the same location.

FOR FURTHER INFORMATION CONTACT: Stan Morrow, Office of Program Management, Consumer Product Safety Commission, Washington, D.C. 20207, 301/492–6453.

A. Background

For several years the Commission has been examining and evaluating the hazards associated with vented and unvented gas-fired space heaters. On January 10, 1974, the Missouri Public Interest Research Group (PIRG) petitioned the Commission to develop mandatory safety standards and labeling requirements for space heaters (CP 74–10)(*7*).[1] The Commission examined the possible hazards associated with several different kinds of space heaters, including space heaters fueled by wood, kerosene, gas, and those powered by electricity. After reviewing the information then available to it, the Commission preliminarily concluded that only gas-fired space heaters presented unreasonable risks of injury to the public from such hazards as carbon monoxide poisoning and/or asphyxiation, contact burns, and fabric ignition. Therefore, the Commission partially denied petition CP 74–10, for space heaters fueled by energy sources other than gas (40 FR 4112, Sept. 5, 1975)(*5*).

At the same time, the Commission directed the staff to develop technical information on gas-fired space heaters for possible development of a proposed mandatory standard for these products. Concurrently, the Commission staff monitored the development of voluntary standards for vented and unvented gas-fired space heaters and wall furnaces by the American National Standards Institute (ANSI Z21.11.1, Z21.11.2, Z21.44, and Z21.49). At a public briefing of the Commission on May 19, 1977, the staff advised the Commission that since 1975 the voluntary standards for vented gas space heaters had been significantly improved; provisions for the safe ignition of vented heaters, reducing surface temperatures, preventing fabric ignition, and minimizing asphyxiation hazards had been, and were continuing to be, substantially upgraded. Additionally, the Commission noted that conformance by manufacturers to the industry's voluntary standards and industry certification programs [2] for vented gas space heaters is high. Industry certification of gas appliances to be installed in residences is widely prescribed by various state and local building codes and safety regulations. The Commission subsequently concluded that a mandatory safety regulation did not appear to be necessary at that time to address any risks of injury that might be associated with vented gas space heaters. A Notice of Decision to this effect was published September 14, 1977 (42 FR 46072)(*4*). The Commission staff continues to monitor these voluntary efforts in order to advise the Commission on further safety developments in the voluntary standards.

However, the Commission determined that the risk of injury from carbon monoxide poisoning associated with unvented gas space heaters was not adequately addressed by the voluntary standards for unvented gas space heaters. Carbon monoxide produced by a vented gas space heater will ordinarily pose a minimal threat from carbon monoxide poisoning because the combustion gases are vented out of the living space through flue openings. Unvented gas space heaters, on the other hand, discharge the products of this combustion directly into the space being heated.

Consequently, on February 14, 1978 (43 FR 6253) (*6*), the Commission proposed a ban of unvented gas space heaters because the Commission determined that the hazard of CO poisoning associated with this product, as further described below, presented an unreasonable risk of injury to the public, and the information then available to the Commission indicated that no feasible standard under the CPSA could adequately protect the public from this unreasonable risk.

Approximately 300 comments on the proposed ban were received from trade associations, distributors of liquid petroleum gas, manufacturers, retailers, individual consumers, consumer interest groups, and government officials. The majority of these commenters were opposed to the proposed ban on the grounds that it would remove from the market a relatively inexpensive source of heat, whose primary users are the elderly, and low and fixed-income

[1] The numbers in parenthesis, from *1–28*, are citations to the bibliography included at the end of this notice. The documents cited are available for review at the Office of the Secretary.

[2] The American Gas Association (AGA), a trade association of the gas distribution industry in the U.S., operates a nationally recognized testing and certification program for gas equipment. The AGA laboratories in Cleveland, Ohio evaluate gas appliances submitted by appliance manufacturers for testing under applicable ANSI voluntary standards. AGA certifies appliances that conform to these standards. Production plants are regularly inspected by AGA to determine manufacturers' continuing conformance to the ANSI requirements. State and local building codes generally regard AGA certification as a prerequisite to permitting installation of gas appliances.

families in the southern United States (*22, 23*).

During the comment period allowed for the proposed ban, the Commission was advised that manadatory standards adopted by several foreign countries require that unvented gas space heaters incorporate a sensing and control device designed to detect the depletion of oxygen in the living space and shut off the flow of gas to the heater before carbon monoxide emissions can build up to a hazardous concentration (*8*). This device, known as an oxygen depletion safety shutoff system (ODS), does not directly measure carbon monoxide in the living space, but senses when the atmospheric oxygen available for combustion is reduced, thereby permitting CO buildup. The device had not, to the Commission's knowledge, ever been adopted for use on unvented gas space heaters by American manufacturers. However, performance requirements addressing the optional use of an ODS on American manufactured heaters were included as part of the ANSI Z21.11.2 standard in effect at that time for unvented gas-fired space heaters (1).

The Commission requested the National Bureau of Standards (NBS) to evaluate the ODS to determine if the use of the ODS in an unvented gas space heater affords an adequate level of safety from CO poisoning.

The results of the National Bureau of Standards evaluation of the ODS show that, under laboratory conditions, the device repeatedly operated satisfactorily to shut down an unvented gas space heater when the room oxygen content was depleted to between 20.4% adn 18.2%. Carbon monoxide concentrations at these levels of oxygen depletion were in a range from 90 to 7 parts per million (ppm), with an average concentration of 37 ppm. During the NBS evaluations, deliberate changes to the heater air shutter to simulate burner maladjustment, and blockage of the ODS air ports to simulate sensor maladjustment and adverse conditions, did not significantly affect the operation of the ODS. Additionally, the ODS operated satisfactorily when used with a variety of representative fuel gases in use in the United States, including propane, butane, and natural gases (*11, 12*).

During this period, the Commission received information cencerning an additional control device, known as a temperature limiting device (TLD), which was purported to prevent a hazardous buildup of carbon monoxide in the living space by shutting off the gas supply to the heater when a room temperature of 100°F was reached. The operation of this device is based on the premise that as combustion air availability decreases, and the potential for higher levels of CO emissions increases due to inadequate air infiltration into the room in which the heater is operating, the room temperature will increase. A TLD requirement for unvented gas space heaters was incorporated into the industry voluntary standard, ANSI–Z21.11.2, on July 26, 1978. However, since very little test data on this device were available, the Commission concluded that additional information was needed to determine the degree of safety a TLD affords when applied to unvented gas space heaters. Therefore, the Commission requested the NBS to evaluate the performance and reliability of the TLD.

The NBS investigation of the TLD indicates that this device appears to be inadequate to address the carbon monoxide poisoning hazard under a variety of limited room ventilation and heat loss conditions. The results of the analyses show that high concentrations of carbon monoxide can exist at various levels of oxygen depletion in ventilated rooms and at temperatures below the shut-off point of TLD.

Complete copies of both NBS reports entitled: (1) Testing for an Oxygen Depletion Detecting for Unvented Gas Fueled Heaters, June 1978,(*11*); (2) Unvented Heater Tests and Analysis of Standards for a Temperature Sensitive Limit Device, November 1978, (*12*), are available through the Office of the Secretary.

Upon review of these test results, particularly the results of the ODS study, the Commission concluded that it could promulgate a feasible consumer product safety standard addressed to the unreasonable risk of carbon monoxide poisoning associated with unvented gas space heaters and that it was not necessary to ban this product. Such a safety standard would require an ODS device which has the capability of indirectly detecting a hazardous atmosphere resulting from carbon monoxide emissions and shutting off the gas supply to the heater.

The Commission also noted: (1) That the oxygen depletion sensor described in the ANSI Z21.11.2–1978 voluntary industry standard entitled *Gas-Fired Room Heaters, Vol. II-Unvented Room Heaters* (*1*), appears to be adequate for the task of reducing or eliminating this risk; and (2) that such a voluntary standard could be proposed as a mandatory standard. Authority for such a proposal is provided by section 7(c)(2). (15 U.S.C. 2056(c)(2)), of the CPSA as amended by section 5 of the Consumer Product Safety Act Authorization Act of 1978 (Pub. L. 95–631). Prior to this amendment, the Commission could publish an existing standard as a proposed standard only after publishing a notice under section 7(b) of the CPSA soliciting persons to either submit an existing standard for Commission consideration or offer to develop a standard for possible proposal. Congress decided with this amendment that the Commission should no longer be required to solicit submission of existing standards when it already knew of an existing standard that could adequately address an unreasonable risk. The amendment also clarified Commission authority to adopt selected provisions of an existing standard or standards. This amendment, which can be expected to save Commission time and resources, is being used by the Commission for the first time in the standard proposed below.

Section 7(c) now provides that where the Commission determines there is a standard issued by a qualified agency, organization or institution which would eliminate or reduce an unreasonable risk of injury if issued in whole or in part, or in combination with any other standard, the Commission may publish such a standard in whole, in part or in combination and with nonmaterial modifications, as a proposed standard.

The Commission directed its staff to prepare for Commission review and publication a draft proposed standard for public comment to incorporate the appropriate sections of the ANSI standard dealing with oxygen depletion sensors for unvented gas-fired space heaters.

On November 29, 1978 in accordance with section 9(a)(1)(b) (15 U.S.C. 2058(a)(1)(b)) of the CPSA, the Commission proposed to withdraw its proposal to ban these products and announced its intention to publish a proposed safety standard (43 FR 55772). During the comment period, the Commission received five comments, none of which opposed the withdrawal of the ban. The Commission, on March 28, 1979 (44 FR 18516) published a final withdrawal of its proposal of February 14, 1978 to declare that unvented gas-fired space heaters are banned hazardous products.

B. Nature of the Risk of Injury

The risk of injury associated with unvented gas-fired space heaters that is addressed by the standard below arises from the poisonous gas, carbon monoxide, entering the human respiratory system.

Unvented gas-fired space heaters derive oxygen needed for combustion

from the space being heated and discharge the products of combustion directly into this same space. The principal products of combustion for any hydrocarbon fuel, whether solid, liquid or gas, are carbon dioxide (CO_2), water vapor (H_2O), and a small amount of carbon monoxide (CO). None of these products poses a serious injury problem for healthy individuals from an acute or short-term exposure at the concentrations given off under usual conditions. However, if the room oxygen is sufficiently depleted due to inadequate ventilation, a dangerous build-up of CO may occur. Additionally, malajustment of the burner, such as can occur by the blockage of burner primary air passages or shutter maladjustment, can also increase CO concentrations in the living space (*2D–3*).

The injury resulting from dangerous levels of CO is caused by a depletion of blood oxygen. Oxygen in the blood combines reversibly with hemoglobin to produce oxyhemoglobin. In this form, oxygen is transported by the blood from the lungs to the body tissues. In the tissues, the oxygen is released from hemoglobin and becomes available to the cells. CO, however, combines with hemoglobin about 200 times more readily than oxygen, to form carboxyhemoglobin, thereby reducing the amount of hemoglobin available to carry needed oxygen. Further, increasing formation of carboxyhemoglobin exerts an inhibitory effect on the remaining oxyhemoglobin in the blood. The reduction of oxygen in the tissues below normal levels is called anoxia and may result in injury to the tissues and death of the individual [(*2D–3, D–4, D–5*) *16*).

The general physiological effects of acute, short-term exposure to increasing air concentrations of CO are presented in Table 1:

TABLE I

Percent CO in atmosphere	Parts per million	Response
0.005	50	Threshold Limit Value, no apparent toxic symptoms.
0.01	100	No poisoning symptoms for long periods of time. Allowable for several hours.
0.02	200	Possible headache, mild frontal in 2–3 hrs.
0.04	400	Frontal headache and nausea after 1–2 hrs.
0.08	800	Headache, dizziness and nausea in 45 min.; collapse and possible unconciousness in 2 hrs.
0.16	1600	Headache, dizziness, nausea in 20 min.; collapse, unconsciousness, possible death in 2 hrs.
0.32	3200	Headache and dizziness in 5–10 min.; unconciousness and possible death in 10–15 min.

TABLE I—Continued

Percent CO in atmosphere	Parts per million	Response
0.64	6400	Headache and dizziness in 1–2 min.; unconciousness and possible death in 10–15 min.
1.28	12800	Immediate effect, unconciousness and danger of death 1–3 min.

Source: *Industrial Toxicology*, 3rd ed. Alice Hamilton, M.D. and Hamet L. Hardy, M.D. Publishing Sciences Group. 1974.

It should be pointed out that time to response in Table 1, is very important when considering the health effects of a particular concentration of CO since a concentration that can be tolerated for short periods may be fatal over several hours. The medical condition of the individual involved is also important in assessing the potential health hazard. Thus, pregnant women (as well as fetuses), smokers, those living at high altitudes or taking certain medication, those with heart/lung impairment or anemia may be subject to increased risk of injury or death even from relatively low concentrations of CO [(*2 D–3, D–5*), *16, 17, 20*).

Exposure to low concentrations of CO from unvented gas space heaters may, however, also occur over a period of weeks or months, thereby rasing the possibility of chronic health effects, that is, health impairment resulting from prolonged or continuous use. Thus, a concentration of CO which might be tolerated for a period of hours may result in health impairment or death if allowed to continue over weeks or months. Studies with animals have indicated that the heart and central nervous system are the organs most sensitive to CO. A number of epidemiological and physiological studies have reported heart and central nervous system effects in humans due to CO exposure. As with acute exposure, the presence of sensitive populations must also be considered, since these same types of individuals as described above might be similarly subject to increased risk of injury or death from chronic CO exposure. [(*2 D–4, D–5*) *16, 17, 20*).

The risk of injury associated with unvented gas space heaters, therefore, derives from the inhalation of CO and the resultant decrease in blood oxygen. Depending on the degree to which blood oxygen is lowered and the period for which it is lowered, there is the possibility of tissue damage and even death. The degree of risk is thus a direct function of the concentration of CO and the duration of exposure and individual sensitivity [*2 D–3, D–4*).

As is evident from the discussion below in Degree of the Risk of Injury, the information available to the Commission on the hazard arising from CO poisoning associated with unvented gas-fired space heaters is predominantly death data. The information suggests that the primary risk is from a sufficiently high, one-time (acute) exposure to CO emissions. The information shows that such acute exposure to CO emissions results in anoxia and death and is, therefore, of particular concern during sleeping hours (*2 D–3*).

As described elsewhere in this preamble, at this time it is economically unfeasible and technologically impracticable to produce a device that can detect certain CO levels of emission and shut off the supply of gas to a heater (*6*). However, as discussed below under Technical Considerations, the acute health risk from high levels of CO that may be produced by unvented gas-fired space heaters can be eliminated or reduced by the proposed standard because the requirement for an ODS can help detect and avoid an atmosphere hazardous to human life (*11*).

Since an ODS functions as a detector and monitor of oxygen depletion, it cannot postively prevent a buildup of CO above levels that may present chronic hazards to certain, sensitive persons. However, insofar as an ODS-equipped unvented heater can affect a reduction of CO emissions by detecting the depletion of oxygen and shutting off the gas supply, such heaters are expected to at least reduce levels of CO available that may present a possible chronic hazard [*2 D–1, D–3, D–5*).

In addition, the standard proposed below requires a permanently-affixed label that warns of CO poisoning and describes persons who may be particularly susceptible to CO emissions.

Notwithstanding these factors, additional work remains to be done in relation to the possible chronic hazard associated with CO emissions from this and other products. Therefore, the Commission staff will continue to study the chronic effects of exposure to CO (including sensitive populations) in order to more fully evaluate the problem of CO exposure in the home.

In assessing the nature and degree of the risk of injury associated with unvented gas-fired space heaters, the Commission was also assisted by experimental and human studies that have been published in the scientific literature and elsewhere (*14* through *21*).

C. Degree of the Risk of Injury

The epidemiological data available to the Commission concerning CO poisoning associated with unvented gas-fired space heaters is summarized in the Commission's 1978 Hazard Analysis Report concerning this product (*3*), and has been updated since that time. The data, predominately death data, are based primarily on a death certificate collection program rather than in-depth investigations, since during most of that time, not many in-depth investigations had been made (*2 C–2*).

An in-depth investigation is usually a personal interview with family or witnesses to the incident. Although these investigations may not be statistically representative of all injuries, they do provide helpful details concerning product identification as well as the cause of injury. The death certificate program collects information from 54 health jurisdictions which include the 50 states and New York City, the District of Columbia, Puerto Rico and the Virgin Islands (*2 C–2*).

As reported in the 1978 Hazard Analysis of Unvented Gas-Fired Space Heaters the Commission death certificate files contain 533 deaths related to gas-fired space heaters for the period from January 1973 to May 1978; 412 of these deaths resulted from CO poisoning. In 72 of the 412 deaths, the gas-fired space heater involved was identified as unvented.[3] From the language used in the cause of death narratives on the death certificates, 64 additional deaths were attributed to unvented gas-fired space heaters bringing the total to 136. A portion of the remaining death certificates involving CO poisoning and gas space heaters could also involve unvented gas space heaters, but this proportion is unknown because the information included in the death certificates was limited (*2 C–2*).

Aside from the Commission data sources, 50 deaths from CO poisoning for the period 1958 through 1978 were reported by consumers and state officials during the comment period for the Commission's proposed ban of unvented gas-fired space heaters (*2 C–1*) published in the **Federal Register** on February 14, 1978 (the proposal was subsequently withdrawn (*2 B–1, B–2*)). Of the 50 reported deaths, 10 deaths were confirmed by Commission epidemiologists as having resulted from CO poisoning associated with unvented gas-fired space heaters. These ten deaths are represented in the data discussed above.

To estimate the number of deaths annually attributable to CO poisoning from unvented gas-fired space heaters, the Commission staff reviewed the Commission's death certificate files for 1977 and compared the findings to the death certificates for CO poisoning from the use of residential fuels (excluding those associated with actual fires) compiled by the National Center for Health Statistics (NCHS) of the Department of Health, Education, and Welfare for the same time period.

In the case of CO poisoning associated with the use of domestic fuels, the Commission's death certificate file has, since 1974, identified about 75 percent of the total number of such deaths reported to NCHS, the source of our national mortality data. In 1977, 348 poisonings were reported from the use of residential fuels; CPSC death certificate files include 289 or 83 percent of these deaths. A distribution of these 289 deaths by the product involved indicates that about one half involved gas space heaters. Although 30 of these cases specified unvented heaters, the majority did not specifically identify the kind of heater involved. Therefore, other data sources were reviewed to provide more specificity.

Between 1973 and 1979, Commission in-depth investigation files show that 41 investigations were made of 41 CO poisoning incidents associated with gas-fired space heaters. A review of this information indicates that of the 41 incidents, 25 (61%) involved vented gas-fired space heaters; 12 incidents (22%) were unvented gas-fired space heaters; the type of heater in the remaining 10% are unknown.

These 41 in-depth investigations do not represent a randomly drawn sample of gas space heater deaths represented in the death certificate file. Most of them were initiated on the basis of newspaper accounts and others from NEISS or consumer complaints. The value of an IDI, in addition to providing information on the cause of injury, is as a source of product information.

On the basis of this detailed product information, CPSC staff assumed that the ratio of unvented to vented gas-fired space heater deaths shown in the IDI files could be extrapolated to the 176 CO poisoning deaths from all domestic-fueled heaters estimated to have occurred in 1977. These calculations, after adjustment for regional differences and possible bias in IDI heater files, result in an overall estimate of about 70 deaths from unvented and 110 deaths from vented gas-fired space heaters (*2 C–2*).

Thus, the Commission estimates that approximately 70 deaths associated with CO poisoning and unvented gas-fired space heaters occur each year in the U.S. This may represent a conservative estimate of such deaths because the effects of CO poisoning impact strongly on the cardiovascular and neurological systems of the body; therefore CO deaths may be easily misdiagnosed and thus may be attributed to other physiological causes (*9*).

There is evidence, from information provided from comments to the proposed ban, to indicate that many nonfatal cases of CO poisoning may go undocumented. In these cases, either an improper diagnosis is made because the symptoms of CO poisoning resemble those of other illnesses such as headaches, dizziness, nausea, or the victims recover at home and do not seek medical attention. These incidents would not appear on any medical records, or in any data sources, as CO poisoning. Therefore, the above number of CO poisonings resulting in injuries and/or deaths that have been reported must be considered a minimum number for this type of injury (*2 C–2*).

[3] In an effort to help determine the levels of fatal blood carboxyhemoglobin (COHb) for these 72 victims, Commission epidemiologists learned from the medical examiners involved that autopsies had been performed in 23 of these cases; COHb levels had been noted for 15 victims. Also, the medical examiner for Dade County, Florida submitted COHb information from 7 additional autopsies involving CO poisoning associated with unvented gas heaters (*9*). The small sample, graphically described in table 2, (*2 C–1*) shows that tolerances to COHb levels vary greatly.

TABLE 2

CO POISONING DEATHS FROM UNVENTED GAS HEATERS FOR WHICH CPSC HAS COHb LEVELS

COHb Scale	COHb Levels From Records of Death	Age of Victim and Comments
75%	76%	37
70%	73% 72%	21 19-pregnant; fetus had 84%
65%	68%	81-coronary history
60%	60%	21
55%	57% 56% 55%	36 43 36
50%	54% 52%	35 45
45%	47% 45% 45%	46 77 21
40%	43% 42% 41% 40%	40 48 67-hypertensive heart disease 22
35%	36% 35%	52 69-arteriosclerotic Disease
30%	33% 33%	49 23-cardiorespiratory failure
25%	26%	54-blood alcohol 0.12%
20%		
15%		
10%		
5%		
0%		

D. Description of the Proposed Standard

Purpose and coverage

The Consumer Product Safety Commission has preliminarily determined that unvented gas-fired space heaters present an unreasonable risk of injury to the public of carbon monoxide poisoning, because carbon monoxide (CO), a toxic product of combustion, can be emitted directly into the atmosphere of the area being heated. The Commission has also preliminarily determined that a device known as an oxygen depletion safety shutoff system (ODS) can shut off the heater's gas supply before the CO can build up to an atmosphere hazardous to human life. Therefore, the Commission believes that an ODS would be adequate to help eliminate or reduce the unreasonable risk.

Proposed Part 1212 provides that on the effective date of the standard, an ODS, as defined in § 1212.3(n) shall be contained in all unvented gas-fired space heaters, not specifically excluded from the standard, that are customarily produced for sale to or for the personal use or enjoyment of consumers in or around a household or residence, a school, in recreation or otherwise. Proposed Part 1212 contains two Subparts—Subpart A describes the safety standard; Subpart B contains the rules for manufacturers and importers to follow concerning certification of compliance with the standard and the maintenance of records showing the basis, in testing, of such certification. The proposed standard also provides for permanently affixed cautionary labels. Also provided is a test procedure which the Commission will use to determine compliance with the standard.

Unvented gas-fired space heaters—inclusions and exclusions

For the purposes of this proposal, an unvented gas-fired space heater is an unvented, self-contained, free-standing or recessed, gas-burning appliance which furnishes warm air to the surrounding living space by gravity convection, fan circulation, or radiation directly from the heater and without duct connections. The heater discharges carbon dioxide and water vapor, and any carbon monoxide in the combustion products, directly into the heated space. Although kitchen ranges and ovens may fit this product description, they are not included within this definition because their function is not to provide room

heat, but to serve as a source of localized heat for food preparation.

Within the scope of this definition, unvented gas-fired space heaters include unvented circulators, radiant heaters, and wall heaters with unvented closed fronts. These products are defined as follows:

(1) "Unvented circulator" is a room heater designed to convert the energy in the fuel to convected and radiant heat, by direct mixing of air to be heated with the combustion products and excess air inside the jacket. Unvented circulators have an external jacket surrounding the burner and may be equipped with radiants with the jacket open in front of the radiants.

(2) "Radiant heater" is an open front unvented room heater designed primarily to convert the energy in the fuel to radiant heat by means of refractory radiants or similar radiating materials. A radiant heater has no external jacket.

(3) "Wall heater, unvented closed front" is an unvented circulator having a closed front for insertion in or attachment to a wall or partition.

The following unvented heaters are excluded from the proposed rule for the reasons set forth below: Gas logs; coal baskets; fireplace inserts (categorized as decorative gas appliances for purposes of this rule); portable catalytic camp heaters; portable camp heaters other than catalytic; and infrared heaters.

(1) "Decorative gas appliances" are excluded. These are gas logs, coal baskets, and fireplace inserts; they are excluded from the rule for the following reasons:

(a) An investigation of available data bases for product-related injuries/deaths revealed no data specific to these products. Although the magnitude of the injury/death problem associated with these decorative gas appliances cannot be accurately determined, it appears to the Commission that consumer use of these appliances is primarily limited to decorative use in vented fireplaces where the risk of CO poisoning is minimal.

(b) The American National Standards Institute (ANSI), a voluntary standards organization, has published a certification standard and labeling requirement for decorative gas appliances for installation in vented fireplaces (ANSI–Z21.60). The large majority of such decorative gas appliances are labeled for use in a vented fireplace.

(c) There has been a steadily declining market for these products over the past several years—approximately 20,000 units were produced in 1976 compared to approximately 42,000 units in 1974.

(2) Catalytic camp heaters and non-catalytic camp heaters are excluded.

(a) Catalytic camp heaters are open faced, unvented heating appliances which utilize a catalyst in the combustion process. The Commission has denied a petition, (CP 75–16, 42 FR 32565, June 27, 1977), to develop a safety standard addressing the hazards of CO poisoning, anoxia and hot surfaces associated with catalytic heaters because, among other considerations, the voluntary standard developed by the ANSI Z21 Subcommittee on standards for Portable Gas-Fired Camping Equipment (Camping Equipment), and adopted by ANSI, appears to reasonably address the possible hazards which may be associated with catalytic heaters. Therefore, the Commission sees no need to include these in the proposed rule.

(b) Non-catalytic camp heaters are unvented portable heating devices of other than the catalytic type for use with liquefied petroleum gases. Because the safety problems inherent to these heaters are essentially the same as the safety problems encountered with catalytic heaters, the ANSI Z21 Camping Equipment Subcommittee has developed and ANSI has adopted a voluntary standard for non-catalytic camp heaters which closely parallels the catalytic heater standard. Therefore, the Commission proposes to exclude non-catalytic camp heaters from this rule.

(3) Infrared heaters are excluded because they are generally used for heating outdoor spaces or non-residential, non-recreational indoor spaces. In these situations the CO poisoning hazard of unvented gas-fired space heaters is not likely to occur.

Requirements

The standard requires that manufacturers, including importers (referred to collectively as manufacturers) of unvented gas-fired space heaters shall be responsible for equipping their products with an oxygen depletion safety shutoff system (ODS). The ODS must shut off the gas supply to the heater when oxygen in the surrounding atmosphere is depleted to less than 18%. In order to avoid the possibility that the ODS would be rendered insensitive to hazardous oxygen depletion levels, the standard provides that the ODS shall be constructed or placed in such a manner that it cannot be adjusted by home users.

Test procedure, certification and recordkeeping

For enforcement purposes, all unvented gas-fired space heaters subject to the standard must be able to pass the test described in proposed § 1212.6. That section requires an unvented gas-fired space heater equipped with an ODS to be placed in a chamber which is closed against outside air. The heater is operated at maximum gas input and measurements are made as the oxygen is depleted. The Commission will use the test to determine whether the ODS on products subject to the standard shuts off the gas supply to the heater when oxygen in the surrounding atmosphere is depleted to less than 18%. While manufacturers are not required to perform this test, they must certify that their products comply with the standard. Such certification of compliance must be based either on a test of each heater or on a reasonable testing program. Manufacturers are responsible for maintaining records of testing performed for certification purposes, whether the tests are performed by the manufacturer or an independent, qualified laboratory in accordance with the provisions of Subpart B.

Origin of the proposed standard for ODS

The proposed standard is adapted from sections of an existing voluntary standard of the American National Standards Institute (ANSI) entitled, *Gas-Fired Room Heaters, Vol. II—Unvented Room Heaters,* Z21.11.2–1978, (ANSI standard) (*1*). Under section 7(c) of the CPSA, as amended (15 U.S.C. 2056(c)), the Commission may publish as a consumer product safety rule, in whole or in part, or in combination with any other standard or portion thereof, a standard proposed or adopted by a qualified agency, organization or institution, and may make nonmaterial modifications to the existing standard before proposing it for public comment.

The ODS part of the ANSI standard was included as an optional provision of the ANSI standard in 1974 for manufacturers of unvented gas-fired space heaters. In 1979, ANSI revised its standard to make this optional provision a requirement, (*2L*), although AGA, the industry's organization responsible for certifying conformance of gas heaters to the ANSI standard, is not yet requiring the ODS device for certification. Consequently, and ODS has not yet been used by U.S. manufacturers of unvented gas-fired space heaters.

However, the ODS section of the ANSI standard was proposed and adopted by the usual procedures of ANSI, a qualified organization, and the ODS sections of the ANSI standard are therefore considered by the Commission to be appropriate for adoption under section 7(c) of the CPSA.

Labeling

The proposed standard provides that a label be permanently attached to unvented gas-fired heaters complying with the standard. The label is cautionary and describes the hazard of CO poisoning; it also describes the ODS system.

E. Technical Considerations

In proposing this standard to eliminate or reduce deaths from CO poisoning associated with unvented gas-fired space heaters, the Commission considered the process by which CO evolution takes place, and measures needed to avoid CO build up. This section of the preamble discusses that process (*11*), and also discusses the ODS systems and the Commission's reasons for proposing this standard.

How carbon monoxide is produced

Many materials react with oxygen, a process called oxidation. When oxygen reacts with a substance to produce large amounts of heat rapidly the process is called combustion or burning. Three things are needed for combustion to take place—fuel, oxygen and heat. For burning the fuel gas, all three elements must be present. Gas alone will not burn. Air, which at sea level normally consists of 20.9% oxygen, supplies the oxygen needed. An open flame (pilot) or electrical means may be used to ignite the gas in gas appliances. Then the gas flame itself provides the heat needed to sustain combustion. Combustion of gas is a chemical reaction between fuel gas and oxygen. The basic elements of fuel gases are hydrogen and carbon. When hydrogen burns, water vapor is produced. Complete burning of carbon in fuel gases carbon dioxide. The water vapor and carbon dioxide are called the products of combustion and are the only by-products that result if a fuel gas is completely burned. To obtain complete combustion enough air must be supplied to the process. This air must have a reasonably normal oxygen content. If not enough air is supplied there is not enough oxygen to combine with the carbon to form carbon dioxide; instead carbon monoxide is formed. Carbon monoxide is a colorless, oderless and highly poisonous gas (*11*).

There are many products that operate by the combustion of fuel gas, including furnaces, boilers, ranges, water heaters and space heaters. Most gas burning appliances are vented which means that the products of combustion are removed from the inside of the building by means of vent pipes. This presents a minimal hazard of carbon monoxide poisoning since any CO produced by incomplete burning of gas is discharged outside. However, appliances which are unvented discharge the products of combustion directly into the space being heated. Gas-fired space heaters may be manufactured as either vented or unvented heaters.

Why unvented heaters produce CO

Unvented gas space heaters can produce CO for several different reasons. If the air supply is not adequate to allow complete combustion, CO will be produced. This is caused by poor ventilation—too few openings in the building to allow air to enter. Other reasons for CO production are related to design of the burner and adjustment of the parts that control the combustion process (*2D–3*).

When an unvented heater is operated in a room that is sealed tightly against air coming in or leaving, the oxygen concentration decreases with time and the CO concentration increases as the combustion process is starved for oxygen. The oxygen concentration decreases steadily from the normal 20.9 percent to between 15 and 16 percent. At about 15% oxygen, the combustion process for most gas appliances stops due to lack of oxygen. The CO concentration increases gradually at first until the oxygen concentration is reduced to below 18% and then proceeds to rise more rapidly. The time it takes for this to occur depends on the room size and the fuel burning rate of the heater. A graphic example of this process as it occurs in a closed room is shown in figure 1. As oxygen is depleted in the combustion process, carbon dioxide is produced and increases steadily. However, CO is produced at an increasing rate at the combustion process is starved (*2D–3*). (To find the CO produced at any given oxygen level, find that oxygen level on the O_2 scale on figure 1; trace right to the oxygen line, then from that point, up or down to CO line. Read this point on the CO scale.)

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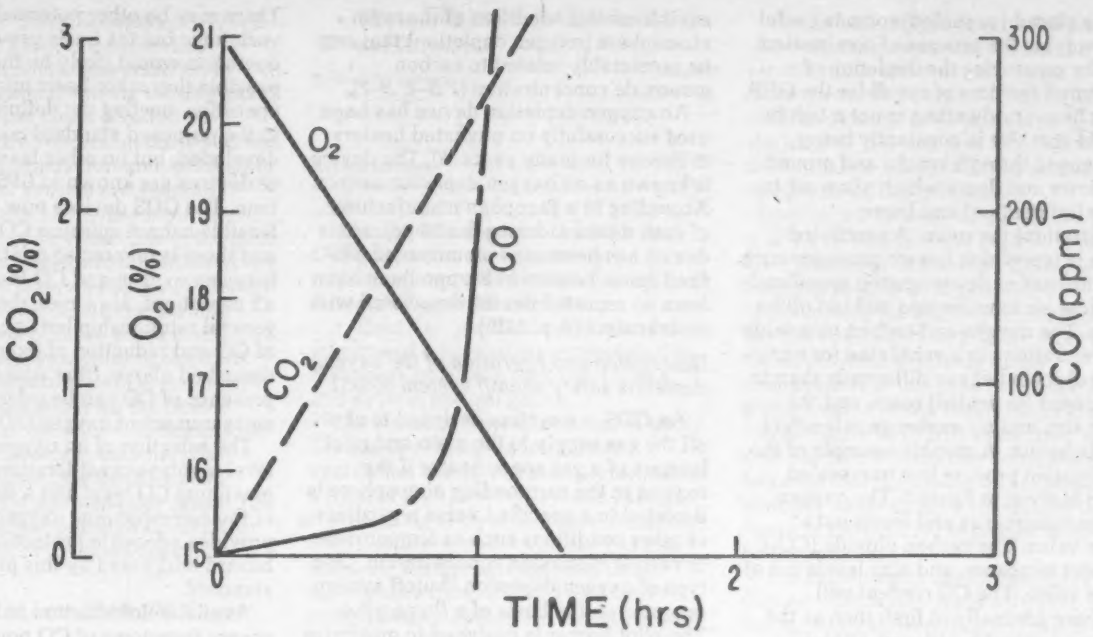

FIG 1—TYPICAL *CLOSED ROOM* CONDITIONS
for
UNVENTED HEATER OPERATION

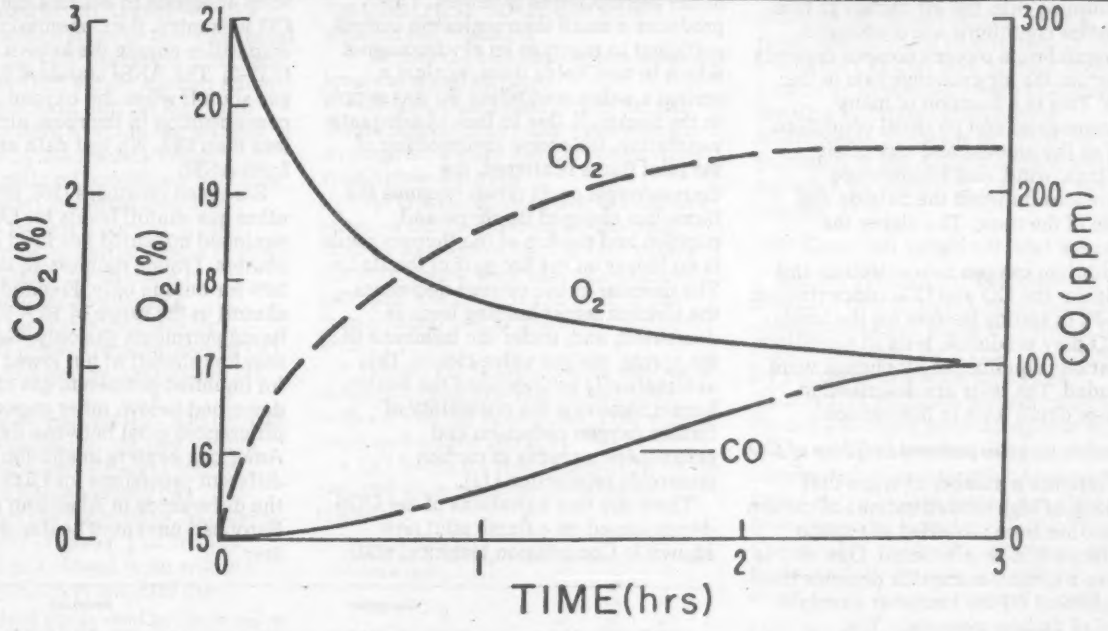

FIG 2—TYPICAL *VENTILATED ROOM* CONDITIONS
for
UNVENTED HEATER OPERATION

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The closed (or sealed) room is useful for studying the process of combustion and for measuring the depletion of oxygen at the time of cutoff for the ODS, but a house or dwelling is not a tightly sealed unit. Air is constantly being exchanged through cracks and around windows and doors which allow air to enter (infiltration) and leave (exfiltration) the room. A ventilated room is one which has air passages such as windows or doors opened specifically to allow air to move into and out of the room. The oxygen and carbon monoxide concentrations in a ventilated (or non-sealed) room behave differently than in the closed (or sealed) room, and the room size and air exchange rate affect this behavior. A graphic example of the combustion process in a non-sealed room is given in figure 2. The oxygen content decreases and levels out at some value. The carbon dioxide (CO_2) content increases, and also levels out at some value. The CO content will increase gradually at first; then as the oxygen content is reduced, CO will increase more rapidly and finally will level out at a certain concentration as did the oxygen and CO_2. This condition is known as equilibrium, which means that the conditions of the room will remain the same as long as the heater fuel burning rate, the air exchange rate, and other conditions are unchanged. The equilibrium oxygen content depends in part on the air exchange rate in the room. This is a function of many environmental and physical conditions such as the amount and size of air openings, wind, and temperature differences between the outside and inside of the room. The higher the exchange rate, the higher the equilibrium oxygen concentration and the lower the CO and CO_2 concentration (*2D–3*). In testing heaters for the levels of CO they produced, tests at conditions of various equilibrium air change were included. The tests are described in greater detail later in this section.

Possible ways to prevent build-up of CO

There are a number of ways that buildup of high concentrations of carbon monoxide from unvented gas space heaters could be prevented. One way is to use a carbon monoxide detector that would shut off the heater at a certain level of carbon monoxide. The Commission determined that this was not feasible because there is no device, at present, that is both technically and economically practicable for performing this function (*6*). A second way is to ban the manufacture of unvented gas space heaters. The Commission proposed this action, but withdrew the proposal after learning that it is possible to measure an environmental condition of the room atmosphere (oxygen depletion) that can be predictably related to carbon monoxide concentration (*2 B–1, B–2*).

An oxygen depletion device has been used successfully on unvented heaters in Europe for many years (*8*). The device is known as an oxygen depletion sensor. According to a European manufacturer of such devices, during the 20 years this device has been used on unvented gas-fired space heaters in Europe there have been no reported deaths associated with such heaters (*8*, p. 32ff.).

Description and operation of the oxygen depletion safety shutoff system (ODS)

An ODS is a system designed to shut off the gas supply to the main and pilot burners of a gas space heater if the oxygen in the surrounding atmosphere is depleted to a specified value regardless of other conditions such as temperature or carbon monoxide concentration. One type of oxygen depletion shutoff system operates on the basis of a flame pilot. The pilot burner is designed to maximize the effect on the flame of operating in an atmosphere in which the oxygen content has been decreased. A device called a thermocouple is positioned in the flame. When the flame is normal (that is, burning in a normal atmosphere) the top of the thermocouple is heated. This produces a small thermoelectric current sufficient to energize an electromagnet which in turn holds open, against a spring, a valve controlling the gas supply to the heater. If, due to lack of adequate ventilation, the shape and position of the pilot flame is altered, the thermocouple cools down because the flame has changed its shape and position and the top of the thermocouple is no longer on the hot part of the flame. The thermoelectric current decreases, the electromagnet holding force is decreased; and, under the influence of the spring, the gas valve closes. This automatically extinguishes the heater burner removing the possibility of further oxygen reduction and consequent increase in carbon monoxide production (*11*).

There are two variations of the ODS design based on a flame pilot now known to Commission technical staff. There may be other potential design variations but the basic principle of operation would likely be the same. It is possible that other basic principles of operation meeting the definition of ODS in the proposed standard could be developed, but no other feasible theories or devices are known to CPSC at this time. The ODS devices now considered feasible cannot measure CO directly, and there is no precise relationship between oxygen and CO that is valid for all conditions. However, there is a general relationship between production of CO and reduction of oxygen, as described above, from which the presence of CO can be inferred from the measurement of oxygen (*2D–2*).

The selection of an oxygen shutdown level involves consideration of a maximum CO level and a determination of the corresponding oxygen level that provides adequate protection from the hazard addressed by this proposed standard.

Available information indicates that severe symptoms of CO poisoning would not occur until CO levels of 200–300 parts per million or more exist for over four hours, and death not until exposure to 1000–2000 ppm or more for at least 2–4 hours (2 D–4).

In considering an oxygen shutdown level adequate to address the hazard of CO poisoning, the Commission noted disparities among the known standards (2 D–2). The ANSI standard provides for gas shutoff when the oxygen concentration in the room atmosphere is less than 18%. No test data are available from ANSI.

European countries (26), provide for other gas shutoff levels for ODS-equipped unvented gas fired space heaters. France requires shutoff at 19.4–20% for butane only. England requires shutoff in the range of 18.7–19.7 for liquid petroleum gas only. Germany requires shutoff at not lower than 19.4% for liquefied petroleum gas only. As described below, other important differences exist between European and American heaters in addtion to the different provisions for ODS. Some of the differences in American and European unvented heater technology are:

	European	American
Installation	Portable	Fixed
Rated Input	16,000 Btu/hr max	15,000–40,000 Btu/hour.
Valves	Off/on type valve	Throttling valve.
Burners	Vertical face	Horizontal face.
Fuel	LPG	Natural gas LPG, and manfactured gas.
Fuel Supply	Self contained LPG bottle	External supply: ● Natural gas main; ● LP gas tank.
Fuel Composition	Constant and controlled	Variable—Natural gas can be Algerian natural gas, peak shaving gas, domestic gas or combinations.
Ignition	Manual	Automatic.
Pilot	Intermittent	Continuous.

The higher than 18% shutdown levels provided for in European heaters present difficulties of application to American heaters. Among the important differences that could affect such application are size and geometry of the heater, fuel composition and fuel supply pressure. U.S. heaters are generally larger and have higher gas input rates. This could require relocation of the pilot which in turn could affect ignition of the heater. In the U.S., a variety of different gases are available and the burning characteristics of these gases could affect the shutdown point of the ODS. Fuel for European heaters is generally located in a container on the heater itself, whereas fuels for U.S. heaters are outside the residence; thus the gas pressure regulator for the European heater serves a much smaller range. The differences in gas pressures could also have an effect on ODS shutdown (2 D–2).

ODS Shutoff at Less Than 18% Oxygen

Information developed during testing of the ODS by the National Bureau of Standards was helpful in determining an oxygen depletion level that would reasonably address the hazard of CO poisoning associated with unvented gas-fired space heaters. The tests of ODS at NBS consisted of: (a) Testing of ODS devices in closed room or non-ventilated conditions to study the levels of oxygen at which the ODS would shut off under various conditions; and (b) testing of unvented heaters to study the level of CO emitted by the heaters under partially ventilated conditions that may be experienced in residences. The testing also included operating the heaters at full and partial inputs of fuel and with primary air shutters in different positions to simulate foreseeable maladjustments which would result in greater quantities of CO being produced during combustion (*11, 12*).

The series of tests on the ODS devices at NBS was conducted on two foreign heaters using seven different foreign ODS devices under various gas pressures and gas input rates, and using different types of gases. The heaters were placed in a closed room with no ventilation and operated until the oxygen content decreased to the level at which the ODS operated to shut off the heater. The tests resulted in the following data relative to the selection of an oxygen depletion shutoff level:

- The ODS devices operated to shut off the heaters at room oxygen concentration of 18.2–20.4%.
- The carbon monoxide concentrations in the closed room at ODS shutoff operated were in the range of 7–90 ppm and averaged 37 ppm.
- The extreme concentrations of both CO and O_2 were:

Extreme O_2 (percent):	CO (ppm)
18.2	[illegible]
20.4	7

Extreme CO (ppm):	O_2 (per cent)
7	[illegible]
90	19.0

- Deliberate changes to heater and ODS characteristics to simulate maladjustment and abnormal conditions did not affect ODS operation.
- The ODS operated satisfactorily when used with various representative fuel gases including propane, butane and several natural gases.

The series of tests conducted to study CO levels emitted under partial ventilation conditions was performed on a total of four American-made heaters, representing each of the three American manufacturers, under various gas input rates, air shutter settings, and flame disturbance from drafts. The oxygen content was stabilized at various levels and CO content was allowed to buildup until constant. These conditions were designated in order to simulate foreseeable conditions in homes in which the amount of ventilation provided is a critical level resulting in a CO buildup prior to heater shutdown by the ODS (*11, 12, 2D–2*). The results showed the following:

- At 19% O_2, two data points were CO levels of 5 and 36 ppm.
- At 18% O_2, 13 data points for CO levels ranged from 7–120 ppm with an average at 43 ppm. All CO levels were well below 200 ppm.
- At 17% O_2, 20 data points were in a range of CO levels from 10–245 ppm with an average of 71. The four values above 100 ppm were 245, 190, 155, and 140 ppm. The highest CO level of 245 ppm is significantly above the 200 ppm level.
- At 16% O_2, 17 data points were in a range of CO levels from 41–395 ppm with an average of 182 ppm. Five values were well above 200 ppm.
- CO levels for these tests at 16, 17, 18 and 19% O_2 concentration were as follows:

Equilibrium O_2 in %	16	17	18	19
CO levels in ppm	41	10	7	[illegible]
	60	12	[illegible]	[illegible]
	75	12	15	
	[illegible]	15	15	
	[illegible]	[illegible]	15	
	135	[illegible]	[illegible]	
	150	20	20	
	160	[illegible]	[illegible]	
	170	25	60	
	170	40	72	
	170	55	78	
	175	75	105	
	225	80	120	
	290	85		
	355	87		
	375	100		
	395	140		
		155		
		190		
		245		

For an 18% oxygen level, NBS tests show that under partial ventilation conditions in the room the range of CO in the room was between 7 and 120 ppm, with an average of 43 ppm, well below the level of 200–300 ppm which health data indicate could result in severe symptoms of CO poisoning if experienced for over 4 hours (*2 D–3, D–4, D–5*). In addition, the highest level of CO reached at 18% in the NBS tests was only 120 ppm, a level generated by maladjusting the primary air shutter to the full open position (*2 D–2*). Also from the death data available to the Commission at this time (see table 2 under Degree of the Risk of Injury) the lowest figure of COHb associated with a death is 26% COHb. The Commission believes that the lowest CO exposure which is likely to have resulted in this figure is 200 ppm for exposure of 10–15 hours or more.

The Commission concludes, therefore, that an ODS which shuts off gas to the heater when surrounding oxygen is depleted to less than 18%, would be adequate to address the acute hazard and thereby reduce the number of deaths from CO poisoning assoicated with unvented gas-fired space heaters. Further, since the ODS can be expected to effect a reduction in CO emissions by shutting off the gas supply, such a reduction can also help reduce levels of available CO that may present a chronic hazard as described above in Nature of the Risk of Injury. Therefore, a Commission proposes to adopt the ODS provision of the ANSI standard which provides for shutoff at less than 18% oxygen.

Test Gases

Section 1212.6(b) of the proposed standard describes the approximate characteristics of gases that would be used to measure the oxygen cutoff point for purposes of testing under the standard. In addition, measurements of the oxygen cutoff point using four other gases to represent the range of combustion characteristics of gases found in the United States, are also being made by industry (27, 28). The Commission welcomes comments on the gases, and their use in tests, from members of the industry and others.

ODS in the Proposed Standard

In proposing to mandate the ODS described in the ANSI standard, the Commission does not imply that this is the only ODS device that would be acceptable under this Part, and would welcome information about other ODS devices that are capable of complying with the standard.

The chart below, presented for ease of comparison, provides the ANSI

requirements for ODS, the requirements of the proposed standard, and explanations of differences between them. In some instances the CPSC provision is the same as the ANSI provision, but both are presented in order that each standard can be read as a separate entity. In addition, the rationale column may contain no explanation of an ANSI provision that CPSC has accepted unchanged. In general, such items in the ANSI standard result from engineering judgment based on experience and skill in the development and manufacture of gas appliances, and the Commission is not aware of any basis for questioning these technical assumptions.

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ANSI	CPSC	RATIONALE
	DEFINITIONS	
Part 4	Section 1212.3	
BTU. Abbreviation for British Thermal Unit. The quantity of heat required to raise the temperature of one pound of water 1°F.	(a) BTU. Abbreviation for British Thermal Unit. The quantity of heat required to raise the temperature 1 pound ( ) of water 1°F ( ).	No modifications except that metric equivalent to be inserted in standard.
BURNER. A device for the final conveyance of the gas or a mixture of gas and air, to the combustion zone. 1. Injection Bunsen Burner. A burner employing the energy of a jet of gas to inject air for combustion into the burner and mix it with the gas. a. Atmospheric Injection Burner. A burner in which the air at atmospheric pressure is injected into the burner by a jet of gas. 2. Luminous or Yellow-Flame Burner. A burner in which secondary air only is depended on for the combustion of gas. 3. Power Burner. A burner in which either gas or air or both are supplied at pressures exceeding, for gas, the line pressure; and for air, atmospheric pressure; this added pressure being applied at the burner. a. Premixing Burner. A power burner in which all or nearly all of the air for combustion is mixed with the gas as primary air. 4. Pressure Burner. A burner which is supplied with an air-gas mixture under pressure (usually 0.5 to 14 inches of water and occasionallily higher).	(b) BURNER. A device for the final conveyance of the gas, or a mixture of gas and air, to the combustion zone.	The specific types of burners defined in the ANSI standard may have some bearing on other parts of the standard. They have been deleted from the CPSC proposal as they are not needed for ODS purposes.
CUBIC FOOT OF GAS. The amount of gas would occupy 1 cubic foot when at a temperature of 60° F if saturated with water vapor and under a pressure equivilent to that of 30 inches of mercury.	(c) CUBIC FOOT OF GAS. The amount of gas which would occupy 1 cubic foot ( ) when at a temperature of 60° F if saturated with water vapor and under a pressure equivalent to that of 30 inches of mercury ( ).	No modifications, except that metric equivalent will be inserted in standard.
NONE	(d) FIELD ADJUSTMENT MEANS. A part, device, or mechanism which allows a change in setting by the user.	The definition is added by Commission staff to clarify the term used in Sec. 1212.5.
HEATING VALUE TOTAL. The number of British Thermal Units produced by the combustion at constant pressure of 1 cubic foot of gas when the products of combustion are cooled to the initial temperature of the gas and air, when the water vapor formed during combustion is condensed, and when all the necessary corrections have been applied.	(e) HEATING VALUE. The number of British Thermal Units ( ) produced by the combustion at constant pressure of 1 cubic foot ( ) of gas when the the products of combustion are cooled to the initial temperature of the gas and air, when the water vapor formed during combustion is condensed, and when corrected to a temperature of 60° F ( ) at a pressure equivalent to 30 inches of mercury ( ).	The definition is changed to incorporate the temperature and pressure corrections which appear elsewhere in the ANSI standard.
INPUT RATING. The gas burning capacity of an appliance in Btu per hour as specified by the manufacturer. Appliance input ratings are based on sea level operation and need not be changed for operation up to 2,000 feet elevation. For operation at elevations above 2, 000 feet, input ratings should be reduced at the rate of 4 percent for each 1,000 feet above sea level.	(f) INPUT RATING. The maximum gas-burning capacity of an appliance in Btu per hour ( ) as specified on the nameplate by the manufacturer.	The definition is changed to specify that input rating be the "maximum" achievable by the heater being tested. The input rating shall be that which appears "on the nameplate" so that if more than one input is shown by the manufacturer the maximum value will be used for the purposes of this test.

ANSI	CPSC	RATIONALE
	DEFINITIONS	
Part 4	Section 1212.3	
Class I. Integral Marking. Marking that is embossed, cast, stamped or otherwise formed in the part.	(g) INTEGRAL MARKING. Marking that is embossed, cast, stamped or otherwise formed in the part.	No modifications.
LIQUEFIED PETROLEUM GASES. The terms "Liquefied Petroleum Gases," "LPG," and "LP-Gas," as used in this standard shall mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them; propane, propylene, butanes (normal butane or isobutane), and butylenes.	(h) LIQUEFIED PETROLEUM GASES. Any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene, butanes (normal butane or isobutane), and butylenes.	No modifications.
LP GAS-AIR MIXTURES. Liquefied petroleum gases distributed at relatively low pressures and normal atmospheric temperatures which have been diluted with air to produce desired heating value and utlization characteristics.	(i) LP GAS-AIR MIXTURES. Liquefied petroleum gas, distributed at relatively low pressures, and normal atmospheric temperatures, which have been diluted with air to produce desired heating value and utilization characteristics.	Editorial changes are made for clarity.
NONE	(j) MANUFACTURED GAS. A gas produced from coal, coke, or oil, or by reforming of natural or liquified petroleum gases or any mixtures thereof, and including any natural or liquified petroleum gas if used for enriching.	This definition has been added for completeness. The definition is taken from the Gas Engineer's Handbook. The gas is typical of the gases recommended by manufacturers for use with their heaters. Where a manufacturer specifies the use of a particular gas, that gas would be the gas used by CPSC staff in testing procedures to determine compliance.
NONE	(k) MIXED GAS. A gas in which manufactured gas is co-mingled with natural or liquefied petroleum gas in such a manner that the resulting product has a Btu value higher than that previously produced by the utility prior to the time of the introduction of natural or liquefied petroleum gas.	(See "Manufactured Gas" above)
NONE	(l) NATURAL GAS. A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous formations beneath the earth's surface, often in association with crude petroleum. The natural gas of commerce supplied to fuel gas markets, usually contains from 80 to 95 percent methane and lesser amounts of ethane and propane. Most of the remainder is nitrogen.	(See "Manufactured Gas" above)
NORMAL BUTANE (N-BUTANE), TECHNICAL GRADE. A liquefied petroleum gas composed of a minimum of 95 percent n-butane (C_4H_{10}) which may contain other impurities such as isobutane, butylenes and propane not in excess of 5 percent.	(m) NORMAL BUTANE (N-BUTANE), TECHNICAL GRADE A liquefied petroleum gas composed of a minimum of 95 percent n-butane (C_4H_{10}) which may contain other impurities such as isobutane, butylenes and propane not in excess of 5 percent.	No modifications.
OXYGEN DEPLETION SAFETY SHUTOFF SYSTEM. A system designed to act to shut off the gas supply to the main and pilot burners if the oxygen in the surrounding atmosphere is depleted to the percent concentration specified by the manufacturer, but not lower than 18.0 percent.	(n) OXYGEN DEPLETION SAFETY SHUTOFF SYSTEM (ODS). A system designed to act to shut off the gas supply to the main and pilot burners if the oxygen in the surrounding atmosphere is depleted to a specified value (see Section 1212.5(b), regardless of other conditions, such as temperature or carbon monoxide concentration. (The system shall depend primarily on lack of oxygen for actuation and not on other phenomena in the surrounding atmosphere such as temperature or CO concentration.)	Specifying the 18% oxygen level is a requirement and not necessary for the definition. A phrase was added to clarify and emphasize that the ODS shall operate at a specified oxygen level regardless of of other conditions such as temperature or carbon monoxide concentration. This was done to preclude other types of devices from qualifying under this standard by chance without necessarily responding to a depleted oxygen condition.

ANSI	CPSC	RATIONALE
	DEFINITIONS	
Part 4	Section 1212.3	
Class II. Permanent Plate Shall be made of metal having a minimum thickness of 0.012 inch and shall be securely attached by mechanical means.	(o) PERMANENT PLATE MARKING. Marking that is made of metal having a minimum thickness of 0.012 inch ( ) and that is securely attached so that it will remain with the heater throughout its life expectancy.	The purpose of this modification is to require that the label remain with the heater throughout its life expectancy. Any technique to accomplish this purpose would be acceptable.
PILOT. A gas flame(s)utilized to ignite the gas at the main burner(s).	(p) PILOT. A small flame which is utilized to ignite the gas at the main burner(s).	No modifications.
PROPANE HD-5. A special grade of liquefied petroleum gas composed of a minimum of 90 percent liquid volume of propane (C_3H_8) and a maximum of 5 percent liquid volume of propylene (C_3H_6).	(q) PROPANE HD-5. A special grade of liquified petroleum gas composed of a minimum of 90 percent liquid volume of propane (C_3H_8) and a maximum of 5 percent liquid volume of propylene (C_3H_6).	No modifications.
SPECIFIC GRAVITY. As applied to gas, the ratio of the weight of a given volume to that of the same volume of air, both measured at the same temperature and pressure.	(r) SPECIFIC GRAVITY. As applied to gas specific gravity is the ratio of the weight of a given volume to that of the same volume of air, both measured at the same temperature and pressure.	No modifications.
NONE	(s) STOICHIOMETRIC COMBUSTION. The rapid oxidation of fuel gases, having the exact proportions of fuel and air required for theoretically complete chemical reaction.	This definition has been added to aid in understanding the standard, since the term is used in the test procedure.
UNVENTED ROOM HEATER. An unvented self-contained, free-standing, nonrecessed (except as noted under 6 of the following classifications), gas-burning appliance for furnishing warm air by gravity or fan circulation to the space in which installed directly from the room heater without duct connection. Unvented room heaters shall not have a normal input rating in excess of 40,000 Btu per hour, except as noted under 6 of the following classifications.	(t) UNVENTED GAS SPACE HEATER. A self-contained, free-standing or recessed, gas-burning appliance which furnishes warm air to the surrounding or adjacent living space by gravity convection, fan circulation or radiation directly from the heater and without duct connections, and which discharges combustion products such as carbon monoxide, carbon dioxide, and water vapor directly into the heated space. The term includes the following:	The definition in the Commission draft is taken from the proposed ban on unvented heaters published in the Federal Register of February 14, 1978 (43 FR 6235). This definition defines the products identified as associated with the unreasonable risk of injury. The basis for the definition is discussed in Section D above.
1. Unvented Circulator. A room heater designed to convert the energy in fuel gas to convected and radiant heat by direct mixing of air to be heated with the combustion products and excess air inside the jacket. Unvented circulators have an external jacket surrounding the burner and may be equipped with radiants with the jacket open in front of the radiants.	(1) "Unvented Circulator." A room heater designed to convert the energy in the fuel to convected and radiant heat by direct mixing of air to be heated with the combustion products and excess air inside the jacket. Unvented circulators have an external jacket surrounding the burner and may be equipped with radiants with the jacket open in front of the radiants.	
2. Coal Basket. An unvented, open-flame type room heater consisting of a metal basket filled with simulated coals which gives the appearance of a coal fire when in operation. A coal basket is for installation in an incombustible fireplace only.	(2) "Wall Heater, Unvented Closed Front." An unvented circulator having a closed front for insertion in or attachment to a wall or partition.	
3. Fireplace Insert. An unvented open-flame radiant-type heater mounted in a decorative metal panel to cover the fireplace or mantel opening. A fireplace insert is for installation in an incombustible fireplace only.	(3) "Radiant Heater." An open-front unvented room heater designed primarily to convert the energy in the fuel to radiant heat by means of refractory radiants or similar radiating materials. A radiant heater has no external jacket.	

ANSI	CPSC	RATIONALE
	DEFINITIONS	
Part 4	Section 1212.3	
4. Gas Log. An unvented, open-flame type room heater consisting of a metal frame or base supporting simulated logs. A gas log is for installation in an incombustible fireplace only.		
5. Radiant Heater. An open-front unvented room heater designed primarily to convert the energy in fuel gas to radiant heat by means of refractory radiants or similar radiating materials. A radiant heater has no external jacket. A radiant heater is for installation in an incombustible fireplace only.		
6. Wall Heater, Unvented Closed Front. An unvented circulator having closed front, for insertion in or attachment to a wall or partition. These heaters shall be plainly marked, "UNVENTED HEATER" in letters ½ inch high and shall not have normal input ratings in excess of 25,000 Btu per hour.		
	REQUIREMENTS	
Oxygen Depletion Safety Shutoff Systems		
Section 1.8 A room heater equipped with an oxygen depletion sensitive safety shutoff system shall comply with the applicable provisions of this standard and, in addition, shall comply with the following specifications.	Section 1212.5 Requirements for ODS (a) Each heater shall be equipped with an oxygen depletion safety shutoff system (ODS) capable of shutting off the gas supply if the oxygen in the surrounding atmosphere is depleted. (The system shall depend primarily on lack of oxygen for actuation and not on other phenomena in the surrounding atmosphere such as temperature or CO concentration.)	Section 1212.5 of the proposal lists three requirements for Oxygen Depletion Sensors as discussed below.
1.8.1 The system shall shut off the gas supply to the main and pilot burners when the oxygen in the surrounding atmosphere is depleted to the percent concentration specified by the manufacturer, but not lower than 18.0 percent.	(b) The concentration of oxygen in the surrounding atmosphere at time of shutoff shall not be less than 18% when corrected to 70 degrees Fahrenheit ( ) at a barometric pressure equivalent to 30 inches of mercury ( ).	Section 1212.5(b) requires the ODS to shut off the main and pilot burners of the unvented gas space heater when the oxygen in the surrounding atmosphere is depleted to less than 18% concentration when corrected to a standard condition of 70°F and a pressure of 30 inches of mercury. The requirement for shutoff not lower than at 18% oxygen was added to the ANSI standard in 1974. The Commission has verified through testing in 1978 at the National Bureau of Standards that an 18% oxygen concentration at heater shutdown is adequate for addressing the risk of carbon monoxide poisoning/asphyxiation associated with unvented gas space heaters. The NBS report suggests that a 19% oxygen concentration requirement might be desirable because higher shutdown levels have been established for European heaters and would provide assurance that high carbon monoxide levels would never occur. Review of NBS data by Commission staff, however, indicates that the risk of acute lethality from overnight exposure to CO at an oxygen depletion level of 18% is relatively low. The rationale for the 18% shutoff level is discussed in detail in Section F above, "Technical Considerations." The ANSI standard allows the manufacturer to specify oxygen cutoff concentration down to and including 18%, but this is irrelevant for the purpose of the proposed standard and has been deleted.
1.8.2 The system shall not incorporate field adjustment means capable of changing the set point at which the system acts to shut off the gas supply to the room heater.	(c) The ODS system shall not incorporate field adjustment means capable of changing the set point at which the system acts to shut off the gas supply to the heater	Section 1212.5(c) requires the ODS to be manufactured so that its set point for oxygen depletion shutdown cannot be adjusted by the user. This requirement is from the ANSI standard and is necessary to prevent users from tampering with the ODS, rendering it inoperative or insensitive to hazardous oxygen depletion.

ANSI	CPSC	RATIONALE
	TEST EQUIPMENT AND PROCEDURES	
Section 2.9 Oxygen Depletion Safety Shutoff Systems On a room heater equipped with an oxygen depletion sensitive safety shutoff system, the system shall act to shut off the gas to the main and pilot burners when the oxygen level in the surrounding atmosphere is reduced to not less than 18.0 percent.	Section 1212.6 Test Equipment and Procedures This section describes the equipment and procedures to be used by CPSC for evaluating the shutdown performance of unvented gas space heaters fitted with oxygen depletion sensors. Alternate procedures and equipment may be substituted where equivalency can be demonstrated to CPSC.	The purpose of the test is to verify that the oxygen depletion sensor shuts off the gas flow to the unvented heater before the room oxygen concentration decreases below 18%. This test method is based on the ANSI standard. The format has been reorganized substantially. Some aspects have been changed as noted below.
Method of Test The burner and primary air adjustments shall be made in accordance with 2.3.3. The room heater shall be installed in a 1000 cubic foot room constructed so as to prevent infiltration of air. The room heater shall be operated for 15 minutes with the door of the room open and the room completely ventilated. The door shall then be sealed and the ventilation stopped. The heater shall be operated at normal test pressure. During the conduct of this test, the room air temperature shall be maintained at 80 F, plus or minus 5 F. A sample of the room atmosphere shall be withdrawn at the start of the test and analyzed for CO_2 and O_2. The percent oxygen* in the room atmosphere shall be continuously monitored during the entire test. When the oxygen depletion shutoff system acts to shut off the gas supply to the room heater, the oxygen content of the room atmosphere, expressed in percent volume, shall not be less than 18.0 percent. This test shall be repeated with the heater operating at both the reduced and increased inlet test pressures specified in 2.3.1 with no change in adjustments. The above tests shall be conducted with the type(s) of gas selected by the manufacturer. * As an alternate to monitoring oxygen concentration, carbon dioxide concentration may be monitored and converted to percentage oxygen by use of the graph or formulas shown in Appendix E.	(a) Facilities Equipment and Conditions (1) Test Room or Chamber Size. The test shall be conducted in a room or chamber of sufficient size to hold the necessary equipment for conduction of the test, but no larger than 1000 cubic feet ( ) in volume. 2) Air Infiltration The room, including the door, shall be constructed so that air infiltration into the room shall not exceed 0.25 volume changes per hour when determined under the following conditions: Heater input rate = 40,000 Btu/hr ( ), Room Temperature = 70°F ( ), Temperature External to Test Room = 70°F ( ), Wind velocity External to Test Room = Zero mph ( ). These restrictions are specified to establish a base for determining air infiltration rate only and are not conditions for the test.	The procedure requires the test to be conducted in a room of sufficient size to hold the necessary equipment but not larger than 1000 cubic feet in volume. The ANSI standard specifies that the test be conducted in a 1000 cubic foot room. However, room size is not significant in conducting this test. As the room becomes larger the time to deplete the oxygen increases, thereby increasing the time to conduct the test. The 1000 cubic foot limit on room size is equivalent to the ANSI requirement. The test is best conducted in a sealed room since the greater the amount of air leaking into the room, the longer it will take oxygen to deplete to the 18% shut off level. However, since the test is only measuring the level of oxygen at ODS shutdown, air filtration is not critical. Section 1212.6(a)(2) of the CPSC standard requires the room to be constructed so that air infiltration into the room shall not exceed 0.25 volume changes per hour when determined under specific conditions. This is a change from the ANSI standard which requires prevention of infiltration. However, the Commission believes that since the NBS achieved satisfactory performance of the ODS in a room constructed so that air infiltration was limited to 0.25 volume changes per hour, it is not necessary to require a test facility with a better seal. Air infiltration of 0.25 changes per hour is sufficiently low that the test can be conducted and accurate results achieved.
APPENDIX E. RELATIONSHIP OF CARBON DIOXIDE TO OXYGEN IN THE CLOSED ROOM TEST SPECIFIED IN 2.9 OF THIS STANDARD (This Appendix is informative and is not part of the standard). When a gas-burning appliance is operated in a room constructed so as to prevent the infiltration of air, the rate of increase in the precent carbon dioxide in the closed room atmosphere is directly proportional to the rate of decrease in the precent oxygen in that closed room atmosphere. The specific ratio between CO_2 and O_2 is dependent on the ultimate CO_2 resulting from the combustion of the particular fuel gas used. The ultimate CO_2, which will vary as a result of the specific composition of the fuel gas, for each of the Test Gases specified in this standard is as follows:		

ANSI	CPSC	RATIONALE

TEST EQUIPMENT AND PROCEDURES

Test Gases	Ultimate CO_2
A	12.2
B and C	11.82
D, E, F, and G	14.0

The following equations may be used to calculate the relative values of CO_2 and O_2 in the closed room atmosphere for a specific test gas.

$$x = 20.93 - y\left(\frac{20.93}{y_1}\right)$$

When a gas-burning appliance is operated

$$y = \frac{y_1}{20.93}(20.93 - x)$$

where:

x = percent O_2
y = percent CO_2, and
y_1 = ultimate percent CO_2

Using the above equations, the graph shown in Figure A-1 was developed as an example to show the relationship of oxygen to carbon dioxide in the atmosphere of a closed room in which a gas-fired appliance is operated on natural gas (test Gas A) and on liquefied petroleum gases (test Gases D and E) and a 1400 LP gas-air mixture (test Gas G.)

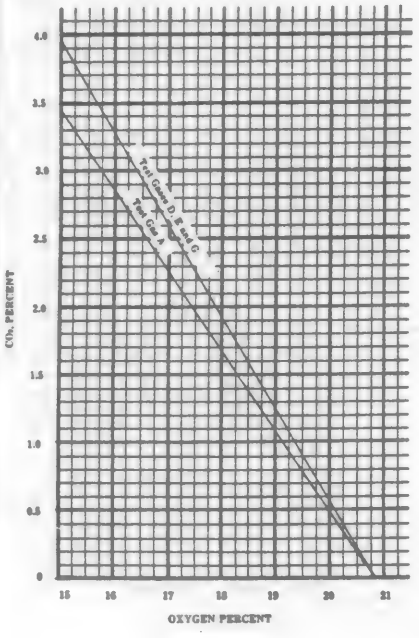

Figure E-1

Relationship of CO_2 to O_2 in the Closed Room Test (Sec 2.9)

3) Provisions for Remote Measurement
Provisions shall be made for the remote measurement and recording of the room air temperature, oxygen or carbon dioxide concentration, and barometric pressure. Room air temperature shall be measured with at least five thermocouples at different levels and plan locations to provide an average room air temperature. The oxygen or carbon monoxide concentration in the room atmosphere shall be measured at a minimum of five locations, the same as the thermocouples above. Five separate measurements or a single measurement through the use of a manifold which samples at the five locations may be used. Barometric pressure may be measured at any location in the test room.

The requirement in Section 1212.6(a)(3) provides for remote measurement and recording of room air temperature, oxygen or carbon dioxide concentration and barometric pressure. This is not a specific requirement in the ANSI standard but is implied because these parameters are necessary in the determination of the heater and ODS performance. CPSC wishes to make clear the parameters which are necessary to measure. The same section specifies that the temperature shall be measured with at least five thermocouples at different locations, that the oxygen or carbon dioxide concentration shall be measured at the same locations as the temperature, and that the barometric pressure may be measured anywhere in the test room. Measurement of temperature and oxygen concentrations are necessary at several locations in order to assure an accurate average. CPSC will use five locations for measuring temperature and oxygen or carbon dioxide concentration in order to assure an accurate average temperature and an accurate oxygen or carbon dioxide concentration. Barometric pressure is naturally uniform through the room.

4) Air Temperature. During the conduct of this test the room air temperature shall not exceed 80°F ( ) nor fall below 60°F ( ). The temperature shall be measured and recorded during the entire test to the nearest 1°F (°C). The correction for conversion to the standard condition of 70 degrees Fahrenheit and 30 inches of mercury is:

Corrected Oxygen at Shutdown =
Measured Oxygen at Shutdown X $\frac{(460+70)}{(460+T_R)}$ x $\frac{(P_B)}{(30)}$

Where T_R = ambient temperature (°F) in test room at shutdown, and P_B = barometric pressure (inches Hg) in test room at shutdown.

In section 1212.6(a)(4) the allowable variation in room temperature has been changed from the ANSI requirement of 80 ± 5 °F to between 60-80° F. This has been done because a 10°F range is too restrictive. The room temperature is not a critical factor in the test because the results are corrected to 70° F regardless of the test conditions. The requirement for measuring temperture to 1° F is specifed in the CPSC standard so that the use of temperature measuring devices with sufficient accuracy are used to assure reasonable maintanance of conditions without being unnecessarily severe. The correction to 70° F is not included in the ANSI standard but has been added to the proposed standard so that test results of different temperatures and barometric pressures can be referenced to a standard condition for purposes of evaluation.

ANSI	CPSC	RATIONALE
	TEST EQUIPMENT AND PROCEDURES	
	5) Oxygen/Carbon Dioxide Concentration. The oxygen or carbon dioxide concentration in the room atmosphere shall be measured during the entire test and recorded to the nearest 0.1%. When carbon dioxide is measured the following equation will be used to calculate the relative value of oxygen in the room atmosphere for a specific test gas. $x = 20.93 - y \frac{(20.93)}{y_1}$ where: x = percent O_2 in room, y = percent CO_2 measured in room, y_1 = ultimate percent CO_2 resulting from stoichiometric combustion of the specific test gas, 20.93 = maximum percent oxygen	The test procedure at Section 1212.6(a)(5) of the proposed standard incorporates provisions of the ANSI standard which address measurement of oxygen or carbon dioxide in the room atmosphere. The ANSI standard requires sampling for CO_2 and O_2 at the start of the test. This requirement has been excluded from the proposed standard because it is not necessary for the ODS test. ANSI uses it when the ODS test and a test required in another part of the ANSI standard (the combustion test) are performed concurrently. The proposed standard does however, contain a requirement for monitoring oxygen or carbon dioxide during the entire test, including ODS shutoff, but not continuously as specified in the ANSI standard. The Commission believes that while it is necessary to have a coherent record of O_2 and CO_2, it is not necessary to have a continuous history. Periodic measurements of O_2 and CO_2 are believed to be sufficient for the purposes of the ODS test. Another requirement of the proposed test procedure is concerned with the method of converting the measurement of CO_2 to the appropriate O_2 value by means of a basic equation. This procedure is taken from the ANSI Standard and is used when CO_2 is monitored instead of direct monitoring of O_2. Monitoring CO_2 is easier than monitoring O_2 because equipment is less complex and less costly. There is no difference in test results when measuring either CO_2 or O_2 because there is an explicit and predictable relationship between CO_2 and O_2 in a closed room.
	6) Air Circulation. The atmosphere of the room shall be evenly mixed and shall not interfere with the operation of the heater under test. Air circulation shall be provided so that sufficient mixing is attained without causing movement of the main burner, pilot burner or oxygen depletion sensor flame. A fan or blower with a discharge capacity of 320 cubic feet per minute ( ) shall be used in a 1000 cubic foot ( ) room. (Smaller test rooms will require a lower discharge capacity.)	At Section 1212.6(a)(6) the requirement for air circulation to mix the room atmosphere has been added so that meaningful test results can be obtained from any part of the room. ANSI has added this to its standard for certain other tests in 221.11.2 and is proposing to add it to the ODS test requirement. In addition, NBS recommended that this requirement be added. The air circulation equipment discharge rate is not a part of the ANSI standard but included in the proposal to provide information about the air movement.
2.2 TEST GASES In conducting the performance tests specified herein, gases with characteristics approximately as shown in Table VIII shall be used. TABLE VIII CHARACTERISTICS OF TEST GASES Gas A (Natural) 1075 0.65 Gas B (Manufactured) 535 0.38 Gas C (Mixed) 800 0.50 Gas D (N-Butane) 3200 2.00 Gas E (Propane HD-5) 2500 1.55 Gas F (Propane-Air) 700 1.16 Gas G (Butane-Air) 1400 1.42 Gas H (Propane-Air) 1400 1.30	(b) Test Gases The test shall be conducted with the type(s) of gas for which the heater is designed, as specified by the manufacturer, except that a heater for use with Natural gas shall be tested with Natural gas and butane-air. Gases with characteristics approximately as shown below shall be used. CHARACTERISTICS OF TEST GASES Natural 1075 0.65 12.2 Manufactured 535 0.38 11.82 Mixed 800 0.50 11.82 N-Butane 3200 2.00 14.0 Propane HD-5 2500 1.55 14.0 Propane-Air 700 1.16 14.0 Butane-Air 1400 1.42 14.0 Propane-Air 1400 1.30 14.0	The proposed standard requires at section 1212.6(b) that the test of the ODS is to be conducted with the types of gases for which it is designed The characteristics of the test gases to be used are described. This requirement is taken from the ANSI standard and is justified on the basis that the ODS should be tested with the gas for which the heater is designed. Natural gas heaters are to be tested with natural gas and butane air gas to demonstrate the ODS equipped heater is capable of operating with a variety of gas compositions likely to be available in Natural gas lines in the United States. The column showing ultimate CO_2 (%) values is included in this chart for convenience. It is taken from Appendix A of ANSI Z21.11.2.

ANSI	CPSC	RATIONALE
	TEST EQUIPMENT AND PROCEDURES	
(See paragraph 2.9 Oxygen Depletion Safety Shutoff Systems - Method of Test, above)	(c) Procedures The heater shall be assembled and adjusted in accordance with any instructions provided by the manufacturer. It shall be installed near the geometric center of the test room floor. The heater shall be started and set at maximum input. The door of the room shall then be closed. The heater shall be operated at maximum input until the oxygen depletion sensor shuts off the heater. When the oxygen depletion sensor acts to shut off the gas supply to the heater the following shall be determined and recorded: 1) oxygen (or carbon dioxide) concentration of the room atmosphere 2) average room temperature 3) barometric pressure The necessary corrections and conversions shall be made and the test results recorded.	The proposed procedure at section 1212.6(c) requires the heater to be assembled and adjusted in accordance with the manufacturer instructions. This is a change from the ANSI standard which specifies certain detailed adjustment requirements that the Commission believes are unnecessarily restrictive for the intended purpose of the test. Consumers generally would assemble and operate a heater in accordance with instructions supplied with the heater by the manufacturer. Therefore, assembling the heater for testing in accordance with the manufacturers instructions tends to simulate actual consumer use. The proposed procedure also at section 1212.6(c) requires installation of the heater in the test room, operation of the heater at maximum input rating, closing the door, and then continuing to operate the heater at maximum input until the oxygen depletion sensor operates to shut off the heater. These requirements are from the ANSI standard test procedure. However, the ANSI requirement for 15 minutes of preheating has been deleted because ANSI runs the ODS shutdown test concurrently with a closed room combustion test that is not part of the proposed standard. The preheating period is needed in that test so that the heater temperature is stabilized. Gas combustion in the presence of cold surfaces can generate higher levels of CO, thereby causing an undue bias in combustion test results. The requirement for operating the heater at the maximum input rating has been added in section 1212.6(c) for clarity. It is specified in other sections of the ANSI standard and should be applied also to this test. Heaters designed for operation over a range of inputs shall be operated at the maximum input of gas only because there is no need to simulate a particular set of room atmosphere conditions, good or bad, to determine the oxygen level at ODS operation. A requirement in the ANSI standard which has not been included in the proposal specifies that the ODS test is to be repeated with the heater operating at both reduced and increased inlet test pressures. This requirement has been excluded because testing at NBS has shown that inlet test pressures had a negligible effect on ODS shutdown performance. Also, heaters are required by ANSI to have pressure regulators which control inlet pressures and, therefore, only slight non-critical pressure variations would occur.

ANSI	CPSC	RATIONALE
LABELING		
Section 1.21 Marking 1.21.4 Each room heater shall bear a clearly legible Class III marking adjacent to the lighting or control area on which appears the following statement: "WARNING: Minimum fresh air opening of _____ square inch must be provided for ventilation." The size opening specified shall be no less than 1 square inch per 1,000 Btu per hour input. The word "WARNING" shall be in letters at least ¼ inch high and the remainder of the wording in letters at least 1/8 inch high. 1.21.5 A room heater equipped with an oxygen depletion safety shutoff system shall bear a Class IIIA marking in a location where it can be easily observed on which appears the following statement: "This heater is equipped with an oxygen depletion safety shutoff system."	**Section 1212.8 Labeling** (a) Each heater shall bear an Integral Marking or Permanent Plate Marking which shall be conspicuous and clearly legible when the heater is in an installed position. The marking shall contain the following statement: **WARNING** When used without fresh air this heater may give off CARBON MONOXIDE, an odorless, poisonous gas. Open a window an inch or two for fresh air. This heater has a pilot light safety system that turns off the heater if not enough fresh air is available. Do not tamper with this safety system. If the heater shuts off, do not relight until you provide fresh air. If the heater keeps shutting off, have it serviced. Keep the burner and control compartment clean. Carbon monoxide poisoning may lead to death. Early signs of carbon monoxide poisoning resemble the flu, with headache, dizziness and/or nausea. If you have these signs, the heater may not be working properly. Get fresh air at once, and have the heater serviced. Some people -- pregnant women, persons with heart or lung disease, anemia, those under the influence of alcohol, those at high altitudes -- are more affected by carbon monoxide than others. The word "WARNING" shall be in letters at least 1/4 inch high and the remainder of the wording in letters at least 1/8 inch high.	The proposed standard has a labeling requirement which is more comprehensive than the the labeling requirement in the ANSI standard. The label provides warning information on ventilation requirements, identifies populations which are at greatest risk, provides information on the function of the ODS, and instructions on what action to take if the heater shuts off. The warnings are necessary to provide sufficient information to allow the user to operate the heater safely, and to be aware of the potential hazards associated with the use of unvented gas space heaters in unventilated spaces. The label construction and material are specified in the proposed standard to insure that it will remain with the heater during its useful life. Definitions of label types are taken from the ANSI standard (see Class I and Class II labels in the definitions section above). The requirement also contains provisions related to the visibility of the labels.

BILLING CODE 6355-01-C

Modifications to the ANSI Standard

The section of the CPSA unde which the Commission proposes to adopt these sections of the ANSI standard, section 7(c)(2), (15 U.S.C. 2056(c)), provides that the Commission may make nonmaterial modifications to the existing standard before adopting the standard. A material modification is one which would substantially alter the purpose of the existing standard or the way in which the purpose of the standard is achieved. In this case, the purpose of the provision of the ANSI standard dealing with ODS is to shut off the supply of gas to unvented gas fired space heaters in order to avoid creation of high CO concentrations. Further, the ODS provision of the ANSI standard requires gas shutoff at less than 18% oxygen which is adequate for achieving the purpose of avoiding creation of high CO concentrations (2D–2). In proposing to adopt unchanged these provisions of the ANSI standard, the Commission is proposing those substantive provisions which are the essence of the ODS sections of the ANSI standard. The changes referred to in the chart above as well as the comprehensive labeling provisions of the proposed standard described, do not affect the inherent nature of the ANSI ODS provisions. Therefore, the changes noted in the above chart and the labeling requirement are nonmaterial modifications and are within the provisions of section 7(c)(2) of the CPSA.

Another function of the labeling requirements is to provide consumers with performance and safety information. Section 27(e) of the CPSA (15 U.S.C. 2076(e)) provides that the Commission may, by rule, require manufacturers to provide such information. Therefore, the labeling provisions, in addition to being proposed under the authority of Section 7(c)(2) are also proposed under the authority of section 27(e).

Labeling—Notification to Consumers of Performance and Safety Information

In considering what information should be provided to users of unvented gas-fired space heaters containing an ODS device, the Commission examined the information called for by labels required to be permanently installed on the heater under the ANSI standard. Such labels contain statements on (1) the necessity for keeping the burner and control compartment clean; (2) the need to provide for fresh air; and (3) a note that the heater is supplied with an ODS device (if it is so supplied).

However, since no information is provided on the reasons that an ODS is needed, namely, to avoid the hazard of CO poisoning, the ANSI label appears to be deficient in meeting the purpose of the ODS section of the ANSI standard. To remedy this situation § 1212.8 of the standard provides a requirement for a label warning of the hazards of CO exposure and describing the functioning of the ODS system (2G). Because the hazard of CO poisoning is not one of which people may ordinarily be aware as they might be of hazards that can be seen or touched, this information should be permanently and prominently affixed to the heater.

As described elsewhere in the preamble, the ODS system detects and monitors oxygen depletion; it cannot positively prevent CO emissions that could be a cause of concern to certain sensitive members of the population. Therefore, the label emphasizes the need for adequate ventilation.

Relationship of ODS to Other Parts of the Product

The proposed standard requiring and ODS system for unvented gas-fired space heaters to address the hazard of CO poisoning, should have no effect on other parts of the heaters or on any other potential hazards that may exist. On the other hand, the effectiveness of the ODS in reducing the CO hazard can depend, in part, on the predictable operating characteristics of the heater, such as providing for proper combustion with a minimum of CO production (1).

The Commission considers that the proposed ODS standard does not replace any voluntary standards or parts of such standards that may apply to other performance or construction characteristics of the heaters for addressing any other potential hazards such as thermal burns or fires. The Commission has not evaluated any provisions of voluntary standards that may deal with these other hazards and, therefore, neither approves nor disapproves them. However, a properly designed and constructed consumer product helps promote safety. Therefore, manufacturers of unvented gas-fired space heaters equipped with ODS systems are encouraged to adhere to customary good manufacturing practices such as may be needed to ensure that the products would be generally acceptable under state and local building codes.

F. Economic Considerations

The Commission has considered the potential economic effects of the proposed standard on industry and consumers, including possible changes in the cost of production and retail prices of unvented gas-fired space heaters equipped with ODS systems. A preliminary economic impact report, prepared by the Commission's economics staff in October, 1979 provides a more detailed discussion of the matters summarized below (*2E, 24*).

Owners of unvented gas-fired space heaters are concentrated in the south central and southeastern United States where climate conditions make central heating systems uneconomic for many households. These owners tend to be the elderly and low income groups of these regions and are most likely to be from among the rural population. Most households chose unvented gas-fired space heaters primarily for the low initial purchase price and low operating costs. These heaters have been among the least expensive heating appliances on the market, although improved voluntary industry standards have increased the price of these heaters. Retail gas space heater prices in 1978 for both vented and unvented heaters were about $140.00 for medium-sized 25,000 BTU heaters. Nevertheless, unvented gas-fired space heaters are not expensive to operate; since they have no flue openings to exhaust energy away from the heated area, they have a thermal efficiency approaching 100 percent and their fuel costs are lower than fuel costs for vented heaters.

Sales of unvented gas-fired space heaters have been steadily declining since 1967, due to rising consumer affluence, preference for central heating, and higher purchase price. In 1976, the last full year of production, about 180,000 heaters were produced. Production was sharply curtailed in 1977 to 82,000 heaters (possibly because industry anticipated government regulation) and was nonexistent in 1978. The declining production and sales pattern might change, however, in light of the rapid increase of energy costs and the efficiency and relatively low operating costs of unvented gas-fired space heaters. Information from the industry indicates that after these years of curtailed production, manufacture of unvented gas-fired space heaters (without ODS devices) has been resumed (*2 J–2*). While specific production data are not yet available, based on informal discussions with manufacturers and industry associations, Commission economists estimate that production for the year 1979 would be about 120,000, mostly targeted at the heater replacement market.

United States heater manufacturers are engaged in research to produce

unvented gas-fired space heaters equipped with ODS systems, and some have submitted their heaters to the French manufacturer of ODS devices for testing application of the European ODS device to U.S. heaters. A heater manufacturer has also sent heaters for testing of ODS application to a U.S. manufacturer of gas controls (*2 J–3*). Commission economists estimate that the cost to manufacturers of applying the European ODS device would be no more than $5.00, including materials and development costs. If design changes to U.S. heaters are needed, as some heater manufacturers believe, the increase at the retail level for ODS-equipped heaters is estimated to be between $10.00 and $17.50. It may be, however, that competitive pressures could keep the final retail price increase using the European device to about $10.00.

If heater manufacturers use an American ODS device now being tested by an American gas controls manufacturer, the cost picture could change because no new hardware or significant heater redesign appears to be needed. Thus, increased cost (about $2.00) would be incurred only for laboratory testing and certification of the ODS system and prototype heaters equipped with ODS systems, resulting in a possible retail price increase of from $4.00 to $7.00.

Commission economists estimate that beginning with 1980, production of unvented gas-fired space heaters could approach the 1976 production level of 180,000, the last year of full production. Rising production may continue, since unvented gas-fired space heaters provide efficient, inexpensive, noncentral heat. Constantly rising fuel costs are considered a factor in the expectation of rising production (*2E*).

Costs and Benefits

Commission economists examined the matter of costs and benefits in relation to a standard for unvented gas-fired space heaters equipped with ODS systems (*2E*). The staff assumed based on industry projections, that 120,000 units would be produced in 1980. Based on industry information, the average life expectancy of such a heater was assumed to be 15 years, plus or minus 5 years (that is, at the end of 15 years, one half of the original 120,000 heaters would still be in use). A maximum lifespan of 25 years was assumed, by the end of which most of the 120,000 heaters would be replaced by newer heaters. From such factors as heater life and number of heaters produced in the past, it was estimated that 7,681,000 heaters were in use in 1977, the same year for which CPSC staff estimated 70 deaths were associated with unvented gas-fired space heaters (see discussion above under Degree of the Risk of Injury). Using the figures 7,681,000 heaters in use and the estimate of 70 deaths per year, an expected death rate associated with CO poisoning of .0000091 per heater was derived. This number was then applied to the 120,000 heaters predicted to be manufactured in 1980, in order to calculate the number of deaths that would occur over the lifespan of these heaters.

For the 120,000 heaters produced in 1980 without an ODS device, it is estimated that 16 lives would be lost. If these 120,000 could have been equipped with ODS devices, and assuming that the ODS is 90 percent effective in preventing CO deaths, the addition of an ODS would save 14 of the 16 lives. (The figure of 16 lives lost is derived over the 25 year lifespan of the heater.) * It would be expected that deaths associated with these 1980 produced heaters would rise as the heaters age. The ratio of .0000091, the estimate of 70 deaths a year, and the number of 1980 units in use over 25 years, result in the estimate of 16 lives lost from the 1980 units during their 25 year lifespan. The estimate of 90 percent effectiveness of ODS in reducing CO deaths is based on an examination of autopsy reports for 22 CO deaths described in table 2, Degree of the Risk of Injury. CPSC estimates from the amount of carboxyhemoglobin detected in the autopsies, that 20 of the 22 individuals would have survived if an ODS system had been attached to these heaters and shut off the gas supply when oxygen was depleted below 18 percent.

The benefit to society from lives saved are extremely difficult to estimate in dollars. Therefore, the Commission staff examined price increases of unvented gas-fired space heaters equipped with ODS to determine how much it would cost to save lives that could be lost to heaters not equipped with ODS systems. Assuming that the American-produced ODS discussed earlier would increase by $2.00 the cost to the manufacturer, the figure of 120,000 heaters produced in 1980 would cost manufacturers an additional $240,000 if equipped with ODS systems. For consumers, the American-produced ODS would increase the cost for a heater by $4.00 to $7.00, or by an additional $480,000 to $840,000 for the projected 1980 output of 120,000. For heaters with the European system the increased cost for 120,000 units to manufacturers would be no more than $5.00 per heater or $600,000 for 120,000 heaters. The increased cost to consumers for the European device would be $10 to $17.50 for a single heater or between $1.2 million and $2.1 million for the projected 1980 output of 120,000.

If the cost estimate of $480,000 to $840,000 for the American ODS is divided by the number of lives expected to be saved, 14, the ODS device would cost approximately $33,300 to $40,000 per life saved. If the cost estimates of $1.2 million to $2.1 million of the European device are used, the cost for a life saved would range from $83,300 to $146,000 (*2E*).

In the area of consumer product safety, the Commission believes it is inappropriate and further, it is not necessary, to assign a monetary value to human life. Nevertheless, since value-of-life estimates (based either on the discounted future earnings methodology which start at about ¼ million dollars per life, or the willingness-to-pay approach which ranges upward to 2 million dollars per life) are considerably higher than $146,000, the highest estimate of a cost per life saved, the Commission considers adoption of an ODS system to be a worthwhile objective. (For a discussion of the methodology of cost/benefit analysis and estimates of the value of life, refer to "Suggested Readings for Cost Benefit Analysis, Value of Life and Discount Rates", a summary of readings on these subjects suggested by Commission economist, (*10*).

The safety benefits (lives saved) by requiring that unvented gas-fired space heaters be equipped with ODS, would occur over a number of years, while costs for such heaters would occur in the year of purchase. In the years following adoption of the proposed standard, the benefits would increase as heaters equipped with ODS devices replace older heaters not similarly equipped. By the time almost all unvented gas-fired space heaters comply with the standard, the expected safety benefits would be 63 lives saved per year (*2E*).

G. Environmental Considerations

An assessment has been made of the potential environmental impact of the proposed standard (*2E*). The assessment addresses potential effects of the proposed regulatory action on the production, distribution, consumption and disposal of unvented gas-fired

* It assumes that in the first year of life of the 120,000 heaters, all 120,000 are in use. Therefore, 120,000 heaters times the death rate (.0000091) means that 1.09 deaths occur in the first year. In each succeeding year some of the 120,000 heaters go out of service and thus the number of deaths attributable to that year's production is lowered. When the deaths for each year for 25 years are added together, the result is 16 deaths.

space heaters and concludes that the proposed standard would not have a significant effect on the quality of the human environment.

Unvented gas-fired space heaters equipped with ODS would result in a safe product that is 100% thermally efficient because energy is not exhausted outside the residence. Thus, consumers could experience savings in fuel consumption over other kinds of heaters. Technical innovation related to this standard could have a beneficial impact on fuel consumption in the future, since the use of ODS could be considered for other products. Patterns of disposal of this product are not expected to be altered by this proposed standard. Moreover, a safety standard would not be expected to result in such changes in methods, materials or other factors of production and distribution that would be of significant consequence to the environment.

Upon reviewing these factors and others raised in the environmental assessment report and accompanying finding of no significant impact on file at the Office of the Secretary, it appears to the Commission that the proposed standard would not lead to any significant impact on air and water quality, solid waste disposal, land use, energy use, or other aspects of the physical environment. Since a significant effect on the quality of the human environment is not anticipated from this proposed standard, the Commission concludes that an environmental impact statement is not needed.

H. Effective Date

Among the factors considered in determining a proposed effective date are the need for the standard in order to reduce the risk of injury adressed by the standard and the time it would take the industry to produce the product described in the standard that is intended to reduce the risk.

In proposing this standard, the Commission preliminarily determines that an unreasonable risk of injury from CO poisoning is associated with unvented gas-fired space heaters. Information available to the Commission indicates that 120,000 of these heaters were produced in 1979, and that a like number will be produced in 1980, (*2E*).

Therefore, the proposed standard, which requires products to be equipped with ODS systems for the purpose of preventing an atmosphere that may be hazardous to human life, should be issued at the earliest possible time. Although ODS systems are not now available on unvented gas-fired heaters produced in the U.S., the Commission has preliminarily concluded that the technology exists for U.S. manufacturers to apply ODS systems to U.S. products, and that it is feasible to manufacture unvented gas-fired space heaters equipped with ODS systems (*2 D–2*).

Upon careful consideration of the relevant information, as discussed below, the Commission proposes that the effective date of this proposed standard be December 31, 1980.

Additional time is needed to develop an ODS for application to U.S. heaters. In the gas appliance industry, it is customary to have a device of new application such as ODS tested by an independent qualified gas testing laboratory prior to using it in a product (*25*). This customary industry practice of having gas appliances evaluated by a qualified gas testing laboratory appears to be a routine practice and is a prerequisite, in many areas, to acceptance of the gas appliance under state and local building codes. The laboratory certifies to the user of the device, in this case the heater manufacturer that the device is suitable for use. The heater manufacturer would then obtain the ODS devices from the manufacturer of gas controls and incorporate the device into the gas appliance after making whatever modifications may be necessary to the appliance. Further, in accordance with usual industry practice, the assembled product, an unvented gas-fired space heater equipped with ODS, would then be examined and tested as an entity by the gas testing laboratory which would certify to the heater manufacturer and customers of the heater manufacturer that the unit is suitable for use. Production of the heater by the manufacturer would generally not take place until the examination is concluded in order to be certain that further modification of the heater is not needed (*2 J–3*).

Manufacturers of unvented gas-fired space heaters are having their heaters examined by manufacturers of gas controls with a view toward developing an ODS that can be applied to U.S. heaters. The manufacturer of ODS systems generally used in European heaters plans to submit to the American Gas Association testing laboratory for evaluation, an ODS device suitable for American heaters (*2 D–2*).

Several American manufacturers of gas controls are also developing ODS systems for American heaters. One of the ODS systems now being tested has shown the capability of gas cutoff at 17.9% oxygen when tested alone in a test chamber. On a heater, this ODS system has achieved gas shutoff at 17.4% oxygen in just a few months of application effort. Three other U.S. manufacturers of gas controls have also committed resources to ODS development.

On the basis of this continuing effort, the Commission's engineering staff estimates that a working ODS device will be available from manufacturers of gas controls by the end of 1979. At that time, the gas testing laboratory would be expected to take approximately 3 months to conduct the performance and life cycle tests necessary to evaluate the ODS device (*2 D–2, J–3*).

Once an ODS device has been tested by the gas testing laboratory, manufacturers of unvented gas-fired space heaters can take the steps needed to begin production. The first and most technical phase of this process is development of prototype models containing the ODS, and testing and evaluation by the laboratory of these prototypes. Manufacturers have estimated the time for this activity to be from 6–12 months depending on the extent of heater redesign needed to incorporate the ODS device. Minor redesign would require about 6 months; more extensive redesign could require 12 months. Commission technical staff and industry spokesmen do not consider it likely that major redesign would be needed; therefore, the Commission considers that 6 months would be adequate for any redesign. Optimistic estimates of the time needed for production of ODS-equipped heaters, based on the assumption that redesign would not be needed, were two to three months (*2 D–2*).

For the second or production phase, manufacturers estimate that to prepare the qualified prototypes for production could take from 6–12 months to redesign and fabricate tooling, order materials, establish a quality control program and set up the production line. The technical problems of heater redesign for the purpose of incorporating ODS devices that might be needed during the first phase of the process are likely to be more complex than the second phase, preparing for production. Thus, where heater redesign problems are considered to be minor, it is likely that production problems would also be minor. Therefore, since heater redesign, if needed, could probably take place within six months, it is likely that six months would be sufficient to prepare for production of ODS-equipped unvented gas-fired space heaters.

These estimates, provided by members of the industry, indicate that ODS-equipped heaters could be ready for the American market from 9 to 15 months after an ODS system is

submitted to a gas testing laboratory for evaluation, (*2 D–2, J–3*). This means that by allowing a reasonable development period estimated by industry for its needs, the production of tested and evaluated unvented gas-fired space heaters equipped with ODS systems could be accomplished by March 31, 1981; by allowing a short development period, for example, if no redesign is needed, production of ODS-equipped heaters could be accomplished some time in September 1980.

Theoretically, a September 1980 effective date for the proposed standard could effect the most immediate reduction in the risk of injury addressed by the standard. However, a review of the usual manufacturing and marketing practices of the unvented gas-fired space heater industry shows that September 1980 would not be a practicable effective date.

The usual practice of the industry is to obtain order commitments from heater distributors during the first calendar quarter of the year. Manufacture and distribution of the product generally does not take place until the second and third calendar quarters. Consumers usually buy unvented gas-fired space heaters in the fall and winter (*2E*). Thus, an effective date in September 1980 would have little influence on 1980 production, since 1980 production would have begun by March 1980 and probably ended by late May or early June 1980. (A March 1980 effective date would not be reasonable since the most optimistic prediction for ability to produce an ODS-equipped heater is September 1980). Therefore, an early effective date such as September 1980, since it could not affect a production cycle, would provide little benefit in the way of reduced risk of injury.

To avoid marketing of unvented gas-fired space heaters manufactured during the next, 1981, production cycle, it would be necessary for the effective date of the standard to be no later than March 31, 1981. Coincidentally, this is the end date for the industry estimated development period for producing ODS-equipped heaters that appears, at this time, to be reasonable. Therefore, it could be assumed that a March 31, 1981 effective date would probably have no adverse impact on industry. Since a March 31, 1981 effective date would precede the 1981 production cycle, it would also avoid possible proliferation of products not equipped with ODS systems.

However, a March 31, 1981 effective date may still contain elements of uncertainty because it occurs three months into the manufacturing/marketing cycle. Distributors may not know whether or not the heaters for the selling season will be equipped with ODS systems. Manufacturers of gas controls may be uncertain as to whether ODS systems are required components of unvented gas-fired space heaters for the 1981 production season. To avoid these uncertainties, it appears to the Commission that an effective date of December 31, 1980 would be preferable. It is consonant with the beginning of the production cycle and provides certainty to all the elements of the industry. Since December 31, 1980 is just prior to usual industry planning for the 1981 production year, it would be expected to have even less impact on industry than would an effective date of March 31, 1981.

The Commission believes it worthy of commendation that many elements of the industry, including heater manufacturers, gas controls manufacturers, as well as voluntary standards and trade groups are diligently engaged in resolving the remaining problems of applying ODS systems to unvented gas-fired space heaters. This ongoing activity, in which the Commission staff is actively involved, indicates that ODS technology is ready for application to U.S. heaters (*2 D–2, F–1, J–3*). Therefore, the proposed effective date of the proposed standard contained in § 1212.2 below, December 31, 1980, is realistic and technologically attainable.

Comments are particularly invited on the issue of the proposed effective date. Such comments will be carefully considered by the Commission before any final standard is issued.

Stockpiling

Section 9(d)(2) of the CPSA (15 U.S.C. 2058(d)(2)) provides that the Commission may, by rule, prohibit manufacturers from stockpiling a product to which a standard applies. Stockpiling to circumvent the purpose of a standard, is defined in the CPSA as manufacturing or importing a product between the date a standard is issued and its effective date, at a rate which is significantly greater than the rate at which it was produced during a base period stated in the rule.

A stockpiling requirement for the period between the issuance and effective dates of this proposed standard is not provided because, at this time, it would serve no useful purpose. As explained in the discussion above on effective date, the production of unvented gas-fired space heaters is generally confined to the second quarter of the production cycle (which corresponds to the second quarter of the calendar year). The probable issuance of a final standard for this product is some time in the third quarter of 1980 and the proposed effective date is December 31, 1980. This means that the period between issuance and effective date would fall during a period of the production cycle when manufacture of unvented gas-fired space heaters would not be taking place. Since section 9(d)(2) provides that a stockpiling provision would apply only to the period between issuance and effective date of the standard, the Commission concludes there is no need for such a provision at a time when only distribution and sale rather than manufacture is taking place. Subsequent events such as changes in manufacturing practices, not now foreseen, may show that a rule is needed, in which case a stockpiling rule would be proposed for public comment. In the interim, the Commission solicits comments from manufacturer of unvented gas-fired space heaters concerning their anticipated manufacturing cycles for the next several years.

I. Enforcement Considerations

Certification of Compliance by Manufacturers and Importers

All manufacturers and importers of unvented gas-fired space heaters subject to the standard are responsible for manufacturing products that meet its requirements.

Section 14(a) of the CPSA (15 U.S.C. 2063(a)) requires manufacturers (including importers) and private labelers of a product subject to standard to issue a certificate of compliance that accompanies the product to the distributor or retailer to whom it is delivered. The certificate must state that the product complies with any applicable standard, name the standard, provide the name of the manufacturer, and the date and place of manufacture. The certificate must be based on a test of each product or upon a reasonable testing program.

Section 14(b) of the CPSA also provides that the Commission may, by rule, prescribe reasonable testing programs for products requiring certification. In addition, section 14(b) provides that, at the option of the manufacturer, the tests which are the basis for certification of compliance may be performed by another person such as an independent laboratory qualified to perform such tests.

Section 14(c) provides that the Commission may, by rule, require the use and prescribe the form and content of labels containing certification by manufacturers that products comply with the standard, and information

relating to identification of the manufacturer.

Under the proposed standard, manufacturers are responsible for certifying that their products comply with the standard. Since it would serve no useful purpose to have private labelers also certify that products manufactured by another comply with the standard, it would be unnecessarily duplicative to require certification by private labelers. Further, manufacturers are in the best position to either test the product or provide for a reasonable testing program. Therefore, manufacturers continue to be responsible for certifying that their products comply with the standard even though the product bears the name of a private labeler and is distributed through the facilities of the private labeler. Thus, manufacturers are responsible for issuing certificates of compliance.

Importers of unvented gas-fired space heaters are responsible for issuing certificates of compliance. If tests or a reasonable testing program have been performed by the foreign manufacturer, the importer may rely on such tests to support the certificate of compliance so long as the importer is a resident of the U.S. or has a resident agent in the U.S. and the test records are maintained in the U.S. Importers are responsible for assuring that the testing required to support the certificate of compliance has been performed properly with acceptable results, and that records of the tests are accurate and complete. Manufacturers and importers are also responsible for maintaining records of tests or testing programs whether these are performed by the manufacturer, or a qualified, independent laboratory. The proposed standard provides that certification by the manufacturer or importer shall be stated on a permanently affixed label which also explains the presence of the ODS system.

Testing

Section 1212.6 of the proposed standard describes the test procedures which the Commission will use to determine whether unvented gas-fired heaters meet the requirements of the standard, although there is no provision in the standard requiring manufacturers to use the same test procedures to determine compliance with the standard. Section 1212.21 describes general requirements for manufacturers concerning testing but does not specify a reasonable testing program.

The test described at § 1212.6 is fairly simple and inexpensive to perform, and does not impair the product. The test may be used for each individual heater or may provide the basis of a reasonable testing program.

The Commission observes that U.S. manufacturers of gas appliances have had considerable experience in being responsible for testing their products because many state and local jurisdictions provide that gas appliances must meet certain building code requirements before they can be installed for residential use. Many jurisdictions require, in addition, that gas appliances such as unvented gas-fired space heaters be certified by qualified testing laboratories as a prerequisite to permitting installation in homes (*13*). Thus, the Commission anticipates that manufacturers who adhere to customary good manufacturing practices that are generally acceptable under state and local building codes would be able to certify to the Commission that their products comply with the proposed standard.

The Commission is presently unaware of information indicating that it will be necessary to prescribe a specific reasonable testing program for unvented gas-fired space heaters equipped with ODS. Therefore, manufacturers and importers may either test each heater, or develop their own reasonable testing programs for certification purposes. Further, so long as the responsible firm certifies compliance with the standard, a reasonable testing program may be performed by a qualified testing laboratory, such as those qualified testing laboratories that perform tests generally found acceptable under state and local building codes.

Should the Commission's enforcement activities relative to these products indicate that the testing programs used are not adequate to ensure that the heaters comply with the standard, the Commission could develop and issue a mandatory testing program.

Recordkeeping

Proposed § 1212.23 of Subpart B requires that manufacturers and importers of unvented gas-fired space heaters subject to the standard maintain written records demonstrating that compliance certificates are based on tests of unvented gas-fired space heaters or a reasonable testing program, and to retain such records for 3 years.

No specific format is prescribed for the record, but the records are required to contain sufficient information to show the nature of a firm's testing procedures, to identify the heater or group of heaters that are certified as a result of the test data, and to show whether the space heaters which are being marketed and certified to comply with the standard, are essentially identical in every respect that relates to compliance with the standard, to the space heaters that were tested for conformance with the standard.

These records, besides aiding Commission enforcement of the standard could be helpful to a manufacturer or importer in limiting the scope of a possible recall order under section 15 of the CPSA. (The Commission is authorized under section 15 to order a manufacturer (including importer), or distributor or retailer of a product which is found, after opportunity for a hearing, to present a "substantial product hazard" to elect one of the following remedies: repair the defective product, replace the product with a non-defective product, or refund the purchase price of the product.) "Substantial product hazard" is described in section 15 to mean a failure to comply with an applicable consumer product safety rule which creates a substantial risk of injury to the public, or a product defect, which (because of the pattern of defect, the number of defective products distributed in commerce, the severity of risk, or otherwise) creates a substantial risk of injury to the public.

The recordkeeping requirements of § 1212.23 are issued under the authority of section 16(b) of the CPSA, which authorizes requirements for the establishement and maintenance of records that are necessary to implement the act or to determine compliance with regulations issued under the act. The records are necessary to monitor compliance with the standard requiring ODS systems for unvented gas-fired space heaters.

Section 16(b) further provides that these records must be made available for inspection by duly designated agents of the Commission upon request.

Product Certification and Labeling

Proposed § 1212.22 requires manufacturers and importers of unvented gas-fired space heaters to affix to the heaters permanent labels which shall be considered a "certificate" of compliance, as the term is used in section 14(a) of the CPSA. Section 14(c) authorizes the Commission to issue rules requiring a product to bear a label containing information similar to that required by section 14(a) for certificates.

The proposed certification label is required to be visible and legible to the consumer and is to include the following information:

1. The statement "Meets CPSC requirements for oxygen depletion safety shutoff systems."

2. The name of the manufacturer or importer issuing the certification label, (unless this information is permanently affixed elsewhere on the heater in a place easily visible to the consumer). This information may be in code when the product bears a private label provided the code mark permits the seller to identify the manufacturer to the purchaser upon his request.

3. The month, year and place of manufacture. This information may be provided in code, such as a serial number, so long as the meaning of each symbol in the code can be made available upon request by consumers, persons in the distribution chain and CPSC.

The proposed certification label is required to be incorporated in the permanent label described in § 1212.8(a) which describes the purpose of the oxygen depletion system in the unvented gas-fired space heater. To avoid confusion as to coverage of the certification, this label is to be separate and distinct from any use or operation labels provided by the manufacturer.

In deciding that certification for unvented gas-fired space heaters should be in the form of a permanent label rather than a separate certificate supplied to persons in the distribution chain, the Commission notes that the label will be visible to all in the distribution chain, and the certification will be immediately available if any questions concerning compliance with the standard arise about a particular heater. A permanent label will benefit consumers and industry, as well as the Commission, in the following ways:

1. For a period of time after the standard goes into effect, both complying and noncomplying heaters may be available on the retail market. A label affixed to the individual product will help consumers make an informed choice between complying and noncomplying products.

2. A permanent label will enable CPSC investigators screening products for compliance to distinguish between those manufactured before and those manufactured after the standard without examining retailers' or distributors' shipping records. Such an examination can be time-consuming and difficult.

3. A permanent label with an identification of the date and location of manufacture will be advantageous to manufacturers, importers, private labelers, distributors, retailers, and consumers in the event of a recall under section 15 of the CPSA.

Proposed Enforcement Policy

Compliance with a mandatory standard for unvented gas-fired space heaters would generally be established during on-site inspections at the manufacturing facility. The Commission plans to conduct such inspections during the second quarter of the calendar year, since that appears to be the peak production period for the heaters. During the inspection, the investigator would examine the product labeling and review the firm's records on testing and certification. If during any such inspection the investigator concluded that there was reason to believe that a particular heater did not meet the requirements of the standard, a sample heater would be collected for testing in accordance with the standard. In addition, before the first heating season after the effective date of the standard, a representative sample of heaters that have been manufactured to comply with the standard would be tested by or under Commission supervision to determine compliance with the standard.

Notice of Noncompliance

Section 15(b) of the CPSA (15 U.S.C. 2064(b)) provides that every manufacturer and importer of a consumer product distributed in commerce, and every distributor and retailer of that product who obtains information which reasonably supports the conclusion that the product is subject to and fails to comply with an applicable consumer product safety rule, shall immediately inform the Commission of such a failure. Thus, manufacturers, importers, distributors and retailers have a duty to report to the Commission any information they may have on the distribution in commerce of noncomplying unvented gas-fired space heaters. Commission regulations describing these requirements in detail can be found at Title 16 of the Code of Federal Regulations, Part 1115.

Failure to comply with the certification requirements in Subpart B below are not subject to the reporting requirements of section 15(b) since such requirements apply only to the standard itself at Subpart A, rather than to the procedures for certification and recordkeeping. Of course, failure to comply with the certification and recordkeeping requirements of Subpart B are subject other enforcement actions under the CPSA as appropriate, such as Civil penalties, criminal penalties or injunctive enforcement (sections 20–22 of the CPSA, 15 U.S.C. 2069–2071).

Since the reporting requirements of section 15(b) apply only to consumer products distributed in commerce, a test failure that occurs during a reasonable testing program for unvented gas-fired space heaters before the heater is distributed in commerce, is not subject to the reporting requirements.

J. Preliminary Statutory Findings

Section 9(c) of the Consumer Product Safety Act requires that prior to issuing a consumer product safety rule the Commission shall consider and make appropriate findings for inclusion in the rule. From information available to the Commission, as set forth in the bibliography to the proposed standard, the Commission has been able to draw preliminary conclusions which are set forth in § 1212.9 as proposed findings in the proposed standard. The proposed findings are subject to change by relevant information. Therefore, the Commission is particularly interested in obtaining information on the following matters:

(1) The degree and nature of the risk of injury which the rule is designed to eliminate or reduce;

(2) The approximate number of consumer products, or types or classes thereof, subject to such rule;

(3) The need of the public for the consumer products subject to such rule, and the probable effect of such rule upon the utility, cost, or availability of such products to meet such need;

(4) Any means of achieving the effect of the rule while minimizing adverse effects on competition or disruption or dislocation of manufacturing and other commercial practices consistent with the public health and safety;

(5) That the rule (including its effective date) is reasonably necessary to eliminate or reduce an unreasonable risk associated with unvented gas space heaters; and

(6) That promulgation of the rule is in the public interest (15 U.S.C. 2058 (b) and (c)).

Section 9(b) of the Act (15 U.S.C. 2058(b)) requires that in promulgating a consumer product safety rule, the Commission shall also consider and take into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule. Since it appears that many users of unvented gas-fired space heaters are elderly and possibly handicapped, the Commission solicits comments as to the potential effect of the proposed standard on this segment of the population.

Information currently available to the Commission on the degree and nature of the risk of injury from CO poisoning associated with unvented gas-fired space heaters, is mostly "death" data. A conservative estimate of 70 deaths a year is indicated by this data. Many of these deaths occur during sleep while

people are unaware and unprotected against CO emissions from these heaters. Since the symptoms of CO poisoning on a lesser scale such as headache, dizziness and nausea ((*2 D–4*) *9*) can be attributed to other illnesses, such symptoms are not generally reported.

The number of products that would be affected by the rule does not appear to be significant. Information from undustry indicates that the production of unvented gas-fired space heaters was stopped in 1978, although manufacture of this product has resumed.

Unvented gas-fired space heaters equipped with ODS devices will provide safe products to the primary users of these heaters who tend to be elderly, low-income residents of southern regions of the U.S. These unvented heaters have a high thermal efficiency, almost 100%, because the energy of the heater is not exhausted to the outside. When ODS systems are attached to such heaters, it would be reasonable to assume that their utility will be greatly enhanced by supplying safety while conserving energy. The retail price of a medium-sized unit of 25,000 BTU capacity was about $140 in 1978. Addition of the ODS would result in a minor price increase; it may range between $4 to $17.50 at retail depending on the ODS system used and the degree of modification needed to apply the ODS to the heater. Commission economists estimate that competitive pressures could result in a retail price increase of about $10 (*2E).*

The Commission is encouraged that industry is actively working toward incorporating ODS into unventd gas-fired space heaters although industry reports that additional research is needed before the product can be manufactured (*2 D–2).* The provisions concerning labeling as well as those concerning certification of compliance and recordkeeping required by the proposed standard are not expected to be a significant part of this price increase. The voluntary ANSI standard to which manufacturers now conform contains provisions on labeling and testing (*2 D–2*) which are required in order to obtain acceptance under many state and local building codes. Thus, since the requirements for certifiction, labeling, and recordkeeping of the proposed standard are not expected to significantly increase the usual administrative burdens on manufacturers for maintaining this kind of information, the Commission does not believe these factors are meaningfully involved in increased costs. The Commission believes that ODS equipped heaters will be available for use by the public in the near future.

In considering this information, the Commission weighed the factors of cost, utility and availability of unvented gas-fired space heaters and compared them with the hazards from CO emissions associated with the product. The factors of unknowing exposure to an atmosphere made life-threatening by CO buildup, particularly during sleep, and the consequent lack of opportunity for people to take steps to remove themselves from the harzard, causes the Commission to preliminarily conclude that the hazard of CO poisoning associated with unvented gas-fired space heaters outweighs the anticipated effect of the rule on the cost, utility and availability of these heaters. Therefore, the Commission preliminarily concludes that these heaters present an unreasonable risk of injury to the public.

Although the voluntary ANSI standard provides for an ODS system for unvented gas-fired space heaters, that provision is not currently required by the industry's certification program which is the basis of acceptance of gas appliances by state and local building and code officials. Further, although maufacturers are diligently engaged in efforts to apply ODS systems to unvented gas-fired space heaters, they are also currently producing and marketing unvented gas-fired space heaters that do not contain ODS systems. Based on statements by industry spokesmen (*2 J–3, I–5*), the Commission believes that production of such heaters, without ODS systems, would continue in the absence of a mandatory standard. Therefore, the Commission concludes that the proposed standard requiring unvented gas-fired space heaters to be equipped with ODS systems is reasonably necessary to eliminate or reduce the unreasonable risk, and that the proposed standard is in the public interest.

K. Possible Preemption

Section 26(a) of the CPSA (15 U.S.C. 2075(a)) provides that when a Commission standard is in effect, it preempts state and local standards or other regulations which apply to the same risk of injury associated with a consumer product—in this case the risk of CO poisoning associated with unvented gas-fired space heaters. An exception to preemption is provided in section 26(b) for state and local standards concerning products for a state or locality's own use, if those standards provide a higher degree of protection than the CPSA standard. In addition, section 26(c) provides that upon application by a state or locality, the Commission may, by rule, exempt from preemption a state or local regulation addressed to the same risk of injury from a consumer product where the Commission determines that such a regulation provides a significantly higher degree of protection than does the federal standard, and that the state/local regulation does not unduly burden interstate commerce.

The Commission believes that a discussion on preemption in the preamble to any final rule issued for this product could be helpful to the numerous jurisdictions that enforce rules on unvented gas-fired space heaters, as well as to consumers and industry members. The Commission recognizes that there may be a wide variety of different rules among state and local jurisdictions. In order to provide guidance concerning rules and regulations that are in effect, the Commission solicits responses to the questions set forth below from persons associated with administering state and municipal regulations, including building codes that would apply to unvented gas-fired space heaters. The questions are for guidance in gathering this information and should not be considered as limiting the kinds of information state and local official believe should be provided:

(1) Name of political entity.

(2) Title of rule.

(3) When was the rule adopted?

(4) Why was the rule adopted?

(5) Please provide the text of the rule.

(6) What potential injury or injuries are addressed by the rule and how are they addressed?

(7) Please state any provisions for enforcing the rule.

(8) If the Commission issues a final standard on unvented gas-fired space heaters, would you expect that your rule would continue in effect?

(9) If the Commission issues a final standard, would you expect your jurisdication to issue an identical rule that could be locally enforced?

(10) Please state the position, title and address of a person who could be contacted for further information.

In addition to soliciting comments on this subject by this notice, the Commission also intends to contact directly those state and local officials whose names are known to Commission staff members.

L. Extension of Time To Publish Final Rule

Section 9(a)(2) of the CPSA (15 U.S.C. 2058(a)(2)) requires the Commission to publish a notice of proposed rulemaking and to provide interested persons with

an opportunity to participate in the rulemaking through submission of written data, views, or arguments. In addition to these written comments, interested persons must also be given an opportunity to make oral presentations of data, views, or arguments.

Section 9(a)(1) of the CPSA provides that within 60 days after publication of a proposed rule, the Commission shall promulgate a final rule or withdraw the proposal. The Commission may extend the 60-day period for good cause and must publish its reasons for extension.

In order to encourage wide dissemination of the proposed rule on unvented gas-fired space heaters and to afford sufficient time for persons to submit written comments, the Commission is permitting a 60-day comment period. The Commission believes that additional time will be needed for staff analysis, Commission evaluation, and publication of any final rule. Therefore, the Commission believes that the 60-day time period provided in section 9(a) between publication of a proposed standard and publication of a final rule should be extended. To conserve the resources that would be needed to issue an extension of time during the comment period, the Commission announces the extension in this proposal, and finds that the need for additional time constitutes good cause for this extension. Therefore, the Commission extends for five months from March 18, 1980 to August 18, 1980 the period in which it must either issue a final rule for unvented gas-fired space heaters containing ODS systems or withdraw the proposed consumer product safety standard. This period may be further extended for good cause published in the **Federal Register.**

M. Date of Promulgation

Section 9 of the CPSA (15 U.S.C. 2058) sets forth the administrative procedures applicable to promulgation of consumer product safety rules and provides guidance concerning the time period for a rule to take effect after the date it has been promulgated by the Commission. However, the CPSA does not define the date of promulgation. In the absence of statutory direction or Commission guidance, therefore, there is an element of uncertainty as to when a rule is considered to be promulgated. Promulgation could take place when the Commission, at a public meeting, votes to issue a rule or when the **Federal Register** notice announcing the rule is signed by the Commission's Secretary, or at another time.

The uncertainty of date of promulgation may be important to those who believe they are adversely affected by a rule issued by the Commission. Section 11 of the CPSA (15 U.S.C. 2060) provides that such persons or groups may petition a U.S. Court of Appeals in the circuit of their residence or principal place of business for judicial review of the rule. In such a case, the Commission is required to respond by filing the record of the rule in the court chosen by the first person or group to file for judicial review.

Thus, persons or groups that are represented at a public meeting where the Commission votes to issue a rule and believe they are adversely affected by the rule, may properly try to be first to file for judicial review in a circuit of their own choosing. Persons or groups unable to be represented at such public meetings, whether for reasons of geographical or financial inconvenience, or otherwise, may also believe they are adversely affected by a Commission decision to issue a rule and yet not have an opportunity to file for judicial review in a forum of their own choosing.

The Commission believes it is important to remove the elements of uncertainty and possible unfairness that may occur concerning opportunity for judicial review of this proposed standard on unvented gas-fired space heaters by promulgating the rule on a date certain after its publication. The Commission observes that courts have traditionally approved a great deal of discretion to agencies in determining the manner in which their actions are promulgated; courts have deferred to the agency's choice as long as the choice is reasonable.

Accordingly, in order to provide the maximum amount of guidance possible to the courts and interested persons, the Commission proposes that this standard be promulgated at noon, Eastern Time, ten days after it is published as a final rule in the **Federal Register.** The Commission believes this choice of promulgation date is reasonable in that it provides sufficient time for interested persons to learn about the rule before a court can be petitioned for judicial review.

N. Conclusion and Proposal

Based on the foregoing information, the Commission preliminarily determines that unvented gas-fired space heaters present an unreasonable risk of injury due to CO poisoning, and that a consumer product safety rule is reasonably necessary to eliminate or reduce this risk. Therefore, the Commission proposes to issue a consumer product safety standard that addresses this risk by requiring that unvented gas-fired space heaters contain ODS systems and specified labeling, and that manufacturers certify compliance and maintain test and certification records.

Accordingly, the Consumer Product Safety Commission proposes to amend Title 16, Chapter II, Subchapter B, of the Code of Federal Regulations, by adding Part 1212, as follows:

PART 1212—SAFETY STANDARD REQUIRING OXYGEN DEPLETION SAFETY SHUTOFF SYSTEMS (ODS) FOR UNVENTED GAS-FIRED SPACE HEATERS

Subpart A—Safety Standard

Sec.
1212.1 Scope and purpose of the standard.
1212.2 Effective date.
1212.3 Definitions.
1212.4 Exclusions.
1212.5 Requirements for ODS.
1212.6 Test equipment and procedures.
1212.7 Certification and recordkeeping.
1212.8 Labeling.
1212.9 Findings.

Subpart B—Certification

Sec.
1212.20 Purpose of certification.
1212.21 Reasonable testing program.
1212.22 Certification of compliance.
1212.23 Records.

Authority: Secs. 2, 3, 7, 9, 14, 16, 27, Pub. L. 92–573, as amended, Pub. L. 94–284, Pub. L. 95–631; 86 Stat. 1207, 1208, 1212, 1220, 1228 as amended 90 Stat. 503, 92 Stat. 3742; 15 U.S.C. 2051, 2052, 2056, 2058, 2063, 2065, 2076.

Subpart A—Safety Standard

§ 1212.1 Scope and purpose of the standard.

(a) *Scope.* This part requires an oxygen depletion safety shutoff system (ODS) and specified labeling for unvented gas-fired space heaters that are customarily produced or distributed for sale to or for the personal use or enjoyment of consumers in or around a household or residence, a school, in recreation or otherwise. Manufacturers (including importers) are responsible for certifying that their products comply with the requirements of the standard and for maintaining records which describe the testing performed as the basis for such certification. Manufacturers are in the best position to provide for testing and certifying compliance with the standard and it is not necessary to also have private labelers certify compliance or maintain testing records. Therefore, private labelers are not required to certify that products comply or to maintain records of testing. (Unvented gas-fired space heaters are defined at § 1212.3; exclusions from this definition are provided at § 1212.4.)

(b) *Purpose.* This standard is intended to reduce the unreasonable risk of injury associated with unvented gas-fired space heaters due to carbon monoxide (CO) poisoning. The standard addresses only the risks arising from carbon monoxide and does not deal with any other possible safety aspects of unvented gas-fired space heaters. The proposed ODS standard does not replace any other voluntary standards or parts of such standards that may apply to other performance or construction characteristics of the heaters for addressing any other potential hazards such as thermal burns or fires. However, to help ensure the quality of the entire product, manufacturers are encouraged to adhere to customary good manufacturing practices for their products such as may be needed to ensure that the products would be generally acceptable under state and local building codes.

§ 1212.2 Effective date.

All unvented gas-fired space heaters defined at § 1212.3 that are manufactured or imported after midnight December 30, 1980 are subject to the requirements of Subpart A and, as provided by Subpart B, shall be certified as complying with Subpart A.

§ 1212.3 Definitions.

In addition to the definitions provided in section 3(a) of the Consumer Product Safety Act (15 U.S.C. 2052(a)), the following definitions apply to this Part. (Metric equivalents appear in parentheses where appropriate.)

(a) BTU. Abbreviation for British Thermal Unit. The quantity of heat required to raise the temperature of 1 pound ( ) of water 1°F. ( )

(b) Burner. A device for the final conveyance of the gas, or a mixture of gas and air, to the combustion zone.

(c) Cubic foot of gas. The amount of gas which would occupy 1 cubic foot ( ) when at a temperature of 60°F ( ) if saturated with water vapor and under a pressure equivalent to that of 30 inches of mercury. ( )

(d) Field adjustment means. A part, device or mechanism which allows a change in setting by the user.

(e) Heating value. The number of British Thermal Units ( ) produced by the combustion at constant pressure, of 1 cubic foot ( ) of gas when the products of combustion are cooled to the initial temperature of the gas and air, when the water vapor formed during combustion is condensed, and when corrected to a temperature of 60°F ( ) at a pressure equivalent to 30 inches of mercury. ( )

(f) Input rating. The maximum gas-burning capacity of an appliance in BTU per hour ( ) as specified on the nameplate by the manufacturer.

(g) Integral marking. Marking that is embossed, cast, stamped or otherwise formed in the part.

(h) Liquefied petroleum gases. Any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene, butanes (normal butane or isobutane), and butylenes.

(i) LP gas-air mixtures. Liquefied petroleum gas distributed at relatively low pressures and normal atmospheric temperatures, which have been diluted with air to produce desired heating value and utilization characteristics.

(j) Manufactured gas. A gas produced from coal, coke, or oil, or by reforming of natural or liquefied petroleum gases or any mixtures thereof, and including any natural or liquefied petroleum gas if used for enriching.

(k) Mixed gas. A gas in which manufactured gas is comingled with natural or liquefied petroleum gas in such a manner that the resulting product has a BTU value higher than that previously produced by the utility prior to the time of the introduction of natural or liquefied petroleum gas.

(l) Natural gas. A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous formation beneath the earth's surface, ofter in association with crude petroleum. The natural gas or commerce, supplied to fuel gas markets, usually contains from 80 to 95 percent methane and lesser amounts of ethane and propane. Most of the remainder is nitrogen.

(m) Normal butane (N-butane), technical grade. a liquefied petroleum gas composed of a minimum of 95 percent n-butane (C_4H_{10}) which may contain other impurities such as isobutane, butylenes and propane not in excess of 5 percent.

(n) Oxygen depletion safety shutoff system (ODS). A system designed to act to shut off the gas supply to the main and pilot burners if the oxygen in the surrounding atmosphere is depleted to a specified value (see § 1212.5(b)). (The system shall depend primarily on lack of oxygen for actuation and not on other phenomena in the surrounding atmosphere such as temperature or CO concentration.)

(o) Permanent plate marking. Marking that is made of metal of a minimum thickness of 0.012 inch ( ) and that is securely attached so that it will remain with the heater throughout its life expectancy.

(p) Pilot. A small flame which is utilized to ignite the gas at the main burner(s).

(q) Propane HD–5. A special grade of liquefied petroleum gas composed of a minimum of 90 percent liquid volume of propane (C_3H_8) and a maximum of 5 percent liquid volume of propylene (C_3H_6).

(r) Specific gravity. As applied to gas, specific gravity is the ratio of the weight of a given volume to that of the same volume of air, both measured at the same temperature and pressure.

(s) Stoichiometric combustion. The rapid oxidation of fuel gases, having the exact proportions of fuel and air required for theoretically complete chemical reaction.

(t) Unvented gas-fired space heater. A self-contained, free-standing or recessed, gas-burning appliance which furnishes warm air to the surrounding or adjacent living space by gravity convection, fan circulation or radiation directly from the heater and without duct connections, and which discharges combustion products such as carbon monoxide, carbon dioxide, and water vapor directly into the heated space. The term includes the following:

(1) *Unvented circulator.* A room heater that coverts the energy in the fuel to convected and radiant heat by direct mixing of air to be heated with the combustion products and excess air inside the jacket. Unvented circulators have an external jacket surrounding the burner and may be equipped with radiants with the jacket open in front of the radiants.

(2) *Wall heater, unvented, closed front.* An unvented circulator having a closed front for insertion in or attachment to a wall or partition.

(3) *Radiant heater.* An open-front unvented room heater designed primarily to convert the energy in the fuel to radiant heat by means of refractory radiants or similar radiating materials. A radiant heater has not external jacket.

§ 1212.4 Exclusions.

The following categories of products are excluded from this standard:

(a) *Kitchen range and oven.* An appliance which provides a source of localized heat for food preparation.

(b) *Decorative gas appliance.* An appliance generally used in a vented fireplace to simulate the appearance of a natural burning material such as wood or coal. The term includes but is not limited to "gas logs", "coal baskets" and "fireplace inserts."

(c) *Catalytic camp heater.* An open faced, unvented heating appliance which utilizes a catalyst in the

combustion process. An existing voluntary standard addresses this product.

(d) *Non-catalytic camp heater.* An unvented portable heating appliance of other than the catalytic type. A voluntary standard addresses this product.

(e) *Infrared heater.* An appliance which directs a substantial amount of its energy in the form of infrared energy into the area to be heated and is generally used for heating of outdoor spaces or non-residential indoor spaces.

§ 1212.5 Requirements for ODS.

(a) Each heater shall be equipped with an oxygen depletion sensor (ODS) safety shutoff system capable of shutting off the gas supply to the heater when oxygen in the surrounding atmosphere is depleted.

(b) The concentration of oxygen in the surrounding atmosphere at time of shutoff shall not be less than 18% when corrected to 70 degrees Fahrenheit ( ) at a barometric pressure equivalent to 30 inches of mercury ( ), when tested in accordance with the procedures at § 1212.6. (The system shall depend primarily on lack of oxygen for actuation and not on other phenomena in the surrounding atmosphere such as temperature or CO concentration.)

(c) The ODS system shall not incorporate field adjustment means capable of changing the set point at which the system acts to shut off the gas supply to the heater.

§ 1212.6 Test equipment and procedures.

This section describes the equipment and procedures to be used by CPSC for evaluating the shutdown performance of unvented gas-fired space heaters fitted with oxygen depletion sensors.

(a) *Facilities, equipment and conditions*—(1) *Test room or chamber size.* The test shall be conducted in a room or chamber of sufficient size to hold the necessary equipment for conducting the test, but no larger than 1000 cubic feet ( ) in volume.

(2) *Air infiltration.* The room, including the door, shall be constructed so that air infiltration into the room shall not exceed 0.25 volume changes per hour when determined under the following conditions:

Heater input rate=40,000 Btu/hr ( ). Room temperature=70°F ( ). Temperature external to test room=70°F ( ). Wind velocity external to test room=Zero mph ( ).

These restrictions are specified to establish a base for determining air infiltration rate only and are not conditions for the test.

(3) *Provisions for remote measurement.* Provisions shall be made for the remote measurement and recording of the room air temperature, oxygen or carbon dioxide concentration and barometric pressure. Room air temperature shall be measured with at least five thermocouples at different levels and plan locations to provide an average room air temperature. The oxygen or carbon dioxide concentration in the room atmosphere shall be measured at a minimum of five locations, the same as the thermocouples above. Five separate measurements or a single measurement through the use of a manifold may be used. Barometric pressure may be measured at any location in the test room.

(4) *Air temperature.* During the conduct of this test the room air temperature shall not exceed 80°F ( ) nor fall below 60°F ( ). The temperature shall be measured and recorded during the entire test to the nearest 1°F (°C). The correction for conversion to the standard condition of 70 degrees Fahrenheit and 30 inches of mercury is:

$$\left(\begin{matrix}\text{Corrected oxygen}\\ \text{at shutdown}\end{matrix}\right)=\left(\begin{matrix}\text{measured oxygen}\\ \text{at shutdown}\end{matrix}\right)\times\left(\frac{460+70}{460+{}^{\circ}R}\right)\times\frac{{}^{\circ}B}{30}$$

Where

°R = ambient temperature (°F) in test room at shutdown.
°B = barometric pressure (inches Hg) in test room at shutdown.

(5) *Oxygen/carbon dioxide concentration.* The oxygen or carbon dioxide concentration in the room atmosphere shall be measured during the entire test and recorded to the nearest 0.1 percent. When carbon dioxide is measured the following equation will be used to calculate the relative value of oxygen in the room atmosphere for a specific test gas.

$$x=20.93-y\frac{(20.93)}{y_1}$$

Where:

x = percent 02 in room,
y = percent CO_2 measured in room,
y_1 = ultimate percent CO_2 resulting from stoichiometric combustion of the specific test gas,
20.93 = maximum percent oxygen content of air.

(6) *Air circulation.* The atmosphere of the room shall be evenly mixed and shall not interfere with the operation of the heater under test. Air circulation shall be provided so that sufficient mixing is attained without causing movement of the main burner, pilot burner or oxygen depletion sensor flame. A fan or blower with a discharge capacity of 320 cubic feet per minute shall be used for a 1000 cubic foot room. (Smaller test rooms will require a lower discharge capacity in the same proportion to the reduction in room size.)

(b) *Test gases.* The tests shall be conducted with the type(s) of gas for which the heater is deisgned, as specified by the manufacturer, except that heaters for use with natural gas shall be tested with natural gas and butane-air. Gases with characteristics approximately as shown below shall be used.

Characteristics of Test Gases

	Heating value (Btu per Ft³)	Specific gravity (Air=1.0)	Ultimate CO_2 (%)
Natural	1075	[illegible]	12.2
Manufactured	535	[illegible]	11.82
Mixed	800	[illegible]	11.82
n-Butane	3200	[illegible]	14.0
Propane HD-5	2500	1.55	14.0
Propane-Air	700	1.16	14.0
Butane-Air	1400	1.42	14.0
Propane-Air	1400	1.30	14.0

(c) *Procedures.* The heater shall be assembled and adjusted in accordance with any instructions provided by the manufacturer. It shall be installed near the geometric center of the test room floor. The heater shall be started and set at maximum input. The door of the room shall then be closed. The heater shall be operated at maximum input until the oxygen depletion sensor shuts off the heater. When the oxygen depletion sensor acts to shut off the gas supply to the heater the following shall be determined and recorded:

(1) Oxygen (or carbon dioxide) concentration of the room atomosphere;

(2) Average room temperature;

(3) Barometric pressure.

The necessary corrections and conversions shall be made and the test results recorded.

§ 1212.7 Certification and enforcement.

(a) *Testing required for certification.* The test procedures described at § 1212.6 will be used for enforcement purposes by the Commission to determine whether unvented gas-fired space heaters subject to this standard actually meet its requirements. Although the standard does not require that a manufacturer or importer perform these tests, section 14 of the CPSA (15 U.S.C. 2063) requires them to certify that their products conform with all applicable consumer product safety standards. The certificate must be based on either a test of each product or on a reasonable testing program. Subpart B below prescribes the requirements that manufacturers and importers shall follow to certify that their unvented gas-fired space heaters comply with the requirements of the standard.

(b) *Reporting of noncompliance.* Every manufacturer and importer of unvented gas-fired space heaters that have been distributed in commerce and every distributor and retailer of such products who obtains information which reasonably supports the conclusion that the product is subject to and fails to comply with the requirements of Subpart A, shall immediately inform the Commission of the failure to comply, in accordance with the reporting provisions of section 15(b) of the CPSA (15 U.S.C. 2064(b), 16 CFR Part 1115). (A test failure that occurs during a reasonable testing program before distribution of any such units is not subject to the reporting requirements of section 15(b). Failure to comply with the certification and recordkeeping requirements of Subpart B is not subject to the reporting requirements of Section 15(b) of the CPSA.)

§ 1212.8 Labeling.

(a) Each heater shall bear an integral marking or permanent plate marking which shall be conspicuous and clearly legible when the heater is in an installed position and shall be separate from any use or operation label supplied by the manufacturer. The marking shall contain the following statement:

Warning

When used without fresh air this heater may give off CARBON MONOXIDE, an odorless, poisonous gas. Open a window an inch or two for fresh air.

This heater has a pilot light safety system that turns off the heater if not enough fresh air is available.

Do not tamper with this safety system. If the heater shuts off, do not relight until you provide fresh air.

If the heater keeps shutting off, have it serviced. Keep the burner and control compartment clean.

Carbon monoxide poisoning may lead to death. Early signs of carbon monoxide poisoning resemble the flu, with headache, dizziness and/or nausea. If you have these signs, the heater may not be working properly. Get fresh air *at once,* and have the heater serviced.

Some people—pregnant women, persons with heart or lung disease, anemia, those under the influence of alcohol, those at high altitudes—are more affected by carbon monoxide than others.

(b) The word "WARNING" shall be in capital letters at least ¼ inch high and the remainder of the wording in letters at least ⅛ inch high.

§ 1212.9 Findings.

(a) *General.* Section 9(c) of the CPSA (15 U.S.C. 2058(c)) provides that to issue a rule, the Commission must make certain findings for inclusion in the rule. (The findings discussed here are preliminary and are subject to change, by subsequent events, or by information and comments received from the public during the comment period permitted after publication of this proposal.)

(b) *The degree and nature of the risk of injury the proposed standard is designed to eliminate or reduce.* (1) The risk of injury addressed by this standard is from the poisonous gas, carbon monoxide (CO) entering the human respiratory system due to the CO hazard associated with unvented gas-fired space heaters. Where room oxygen is sufficiently depleted due to inadequate ventilation or maladjustment of the heater's burner, a dangerous buildup of CO may occur. CO combines readily with hemoglobin in the blood thereby reducing the capability of the blood to carry oxygen needed to maintain body tissues. The dangers of CO poisoning may be higher for certain sensitive persons such as those suffering heart/lung impairments, for pregnant women, and smokers, for examples. There is also the possibility of chronic health effects from prolonged exposure to low concentrations of CO. Depending on the degree to which CO results in the lowering of blood oxygen, and the period for which it is lowered, tissue damage or death can occur. The degree of risk is a direct function of the concentration of CO, the duration of exposure and individual sensitivity. Information available to the Commission on the hazard of CO poisoning associated with unvented gas-fired space heaters is predominantly death data. The information suggests that the primary risk is from a high, one-time (acute) exposure to CO emissions. Such acute exposure is of particular concern during sleeping hours. Lack of data other than death data may be related to the fact that symptoms of CO poisoning such as headache, dizziness, and nausea resemble those of other illnesses.

(2) The Commission has information on 200 deaths for the period from October 1973 to March 1979. This may represent a conservative estimate because the effects of CO poisoning impact strongly on the cardiovascular and neurological systems of the body and this factor may cause CO deaths to be misdiagnosed and attributed to other physiological causes. Commission data indicate that about 70 deaths a year can be attributed to CO poisoning associated with unvented gas-fired space heaters.

(3) A 1979 Commission study of CO blood levels (COHb) describing 22 autopsy reports of CO poisoning associated with unvented gas-fired space heaters, indicates that if the heaters involved in the incidents had been equipped with oxygen depletion systems as required by the proposed standard, the gas supply to the heaters would probably have been shut off before the fatal COHb blood levels could have been reached in 20 of the 22 cases. On this basis, the Commission estimates that the proposed standard can be expected to reduce the annual estimated death figure of 70 by about 90%.

(c) *Products subject to the rule.* The production of unvented gas-fired space heaters defined at § 1212.3(t) declined about 70% between 1967 and 1976. This decline may have been due to rising consumer affluence, preference for central heating, or higher purchase prices. In 1976, 182,000 units were produced. In 1977, production was down to about 82,000, possibly in expectation of CPSC regulation. No unvented gas-fired space heaters were produced in 1978. Production began again in 1979 and is estimated to number 120,000 for the year. For 1980, in light of possible increased demand due to the rapid increase in energy costs and the relatively low operating costs of unvented gas-fired space heaters, industry estimates that another 120,000 units would be produced.

(d) *The need of the public for consumer products subject to the rule.* Owners of unvented gas-fired space heaters are concentrated in southern areas of the United States where the climate may make central heating systems uneconomical for certain households. These owners tend to be the elderly and low income groups of this area. The energy efficiency of unvented gas-fired space heaters means fairly low operating costs. Therefore, this product is particularly important for those in the lower socio-economic brackets for whom substitute heaters such as vented gas heaters or electric heaters may be too costly because of higher operating costs.

(e) *Probable effect of the rule on the utility of the product.* The Commission believes that the utility of the product will be greatly increased by the proposed rule. Those who have historically used this form of heating could be assured that heaters equipped with ODS systems are safer than those not so equipped. In addition to safer products for the replacement market, an ODS-equipped heater may appeal to those who may have hesitated to use unvented heaters because of the CO hazard.

(f) *Probable effect of the rule on the cost of the product.* (1) Cost estimates are made on the basis of two known

ODS devices. The cost of one of the devices to the heater manufacturers is estimated to be about $2; the other is estimated at no more than $5.00. In 1978, the retail price of a medium size unvented gas-fired space heater of 25,000 BTU capacity was about $140. Competitive pressures should keep the retail price increase down. The Commission estimates, on the basis of information submitted by industry, that the retail price could increase in a range between $4 and $17.50. The proposed provisions concerning labeling as well as those concerning certification of compliance and recordkeeping are not expected to be a significant part of this price increase. The voluntary standard to which U.S. manufacturers now conform contains provisions on labeling and testing which are generally needed for acceptance by many state and local jurisdictions. In addition, manufacturers currently maintain production records. Thus, since the proposed requirements for certification labeling and recordkeeping are not expected to significantly increase the usual administrative burdens a manufacturer may incur in maintaining this kind of business information, the Commission believes that the certification, labeling and recordkeeping requirements of the proposed standard are not meaningfully involved in any possible increased costs of this product.

(2) Commission economists estimated, on the basis of the industry-projected 1980 output of 120,000 unvented gas-fired space heaters, that the addition of the least expensive ODS (American) currently know, $2, would add an additional $240,000 to the manufacturers' cost of producing the entire year's output. To the consumer, the increased cost would be $4 to $7 per unit or $480,000 to $840,000 total price increase. For the European device, the added cost for manufacturers to apply the device to the 1980 projected output, $5.00, could be about $600,000. The consumers' increased cost for the European device would be $10 to $17.50 per heater or a total increase of $1.2 million to $2.1 million.

(3) By using an equation based primarily on the number of unvented gas-fired space heaters produced in the past, the expected usage life of the units, the expected production for the year 1980, and the estimate of 70 deaths a year derived from a Commission study of autopsy reports of CO poisoning deaths from these products, the staff calculated that the number of deaths likely to occur during the 25-year usage span of the 120,000 heaters produced in 1980, would be 16. On the assumption, discussed in paragraph (b) of this section that the ODS would be 90% effective in preventing CO deaths, Commission staff estimates that the addition of ODS could have saved 14 of the 16 lives.

(4) If the cost estimate of $480,000 to $840,000 for the American ODS is divided by the number of lives expected to be saved, 14, the ODS device would cost approximately $33,300 to $40,000 per life saved. If the cost estimates of $1.2 million to $2.1 million of the European device are used, the cost for a life saved would range from $83,300 to $146,000. Value-of-life estimates, based on the methodology of discounted future earnings start at about ¼ million dollars per life, the willingness-to-pay theory ranges upward to 2 million dollars per life. In the area of product safety and consumer health, however, the Commission believes it is inappropriate and unnecessary to assign a monetary value to human life. Nevertheless, the Commission observes that these value-of-life estimates are considerably higher than $146,000, the highest estimated increased cost for equipping a year's production of unvented gas-fired space heaters with ODS systems. On this basis, the increased cost can be considered minimal. (For a dicussion of the methodology of cost/benefit analysis and estimates of the value of life, refer to "Suggested Readings for Cost-Benefit Analysis, Value of Life and Discount Rates", a summary of readings on these subjects suggested by Commission economists, on file at the Office of the Secretary. Also on file there is the Commission staff's October 1979 Preliminary Report on the Economic Impact of this proposed standard, which provides further details on the cost/benefit study summarized briefly in this subsection.)

(g) *The probable effect of the rule on the availability of the product.* The Commission believes that the standard would not have a significant effect on the availability of unvented gas-fired space heaters. Historically, the availability of this product declined over the last decade; none appear to have been manufactured in 1978. Production of the heater in 1979 is estimated to be about 120,000. This figure is considerably less than the total of 182,000 manufactured in the last full production year of 1976. Further the three known manufacturers of the product are actively engaged in measures to equip their heaters with ODS devices. The Commission believes there will be only a short period of time before ODS-equipped unvented gas-fired heaters will be ready for the market, and that manufacturers will be better able to make production plans when they are certain of their obligations under the standard.

(h) *Other means of achieving the objective of the proposed standard.* The Commission considered other means of attaining the objective of the standard—that is, to eliminate or reduce the hazard of CO poisoning associated with unvented gas-fired space heaters. Among the means considered was a CO detector and shutoff device, but the Commission found this to be technically impracticable and economically unfeasible. The Commission also considered banning manufacture and distribution of unvented gas-fired space heaters before learning of the ODS and its capability to respond to oxygen depletion and thereby help avoid exposure to high concentrations of CO emissions.

(i) *Unreasonable risk of injury.* (1) The term "unreasonable risk of injury" is not defined in the CPSA; however, the term "risk of injury" is defined at section 3(a)(3) to mean a risk of death, personal injury or serious or frequent illness. The legislative history of the CPSA (H.R. Rep. No. 92–1153, 92d Cong., 2d Sess., 1972, p. 33) states that determining unreasonable hazards (risks) involves balancing the probability that risk will result in harm and the gravity of such harm against the effect of regulation on the product's utility, cost, and availability to the consumer. The primary risk of CO poisoning associated with unvented gas-fired space heaters is death. The hazard of CO poisoning is particularly insidious since CO is colorless and odorless, as well as poisonous. Thus even people who are awake and active, and move in and out of the space where CO buildup may be occurring from an unvented gas-fired space heater in an oxygen-deficient atmosphere, would generally be unaware of CO emissions. During sleeping hours, this lack of awareness can mean death. The ODS system required for unvented gas-fired space heaters in this standard functions as a detector and monitor of oxygen depletion and its accompanying condition of CO buildup. The ODS acts to shut off the gas supply to the heater if oxygen is depleted to less than 18%. The Commission estimates (see item (f)) above that the ODS can effect a death reduction of 90% for a cost increase that is small for the industry and for consumers. Since assigning a monetary value to human life is difficult, it is also difficult to estimate the benefits of this potential death reduction. In reviewing the possible increased costs, the

Commission concludes that the benefits in death reduction far outweigh the costs of incorporating ODS system in unvented gas-fired space heaters.

(2) An ancillary benefit of the ODS system is that it may help reduce any chronic health effects from CO poisoning associated with unvented gas-fired space heaters, because the ODS would reduce CO levels that may present a chronic hazard to susceptible individuals such as smokers, persons with heart or lung impairment, and pregnant women. The Commission believes, in addition, that the utility of unvented gas-fired space heaters would be increased by the addition of ODS systems. Persons who may not formerly have purchased this product because of safety considerations, may now do so because of assurance that the ODS would protect them from an atmosphere hazardous to human life. Other benefits of possibly increased use of ODS-equipped unvented gas-fired space heaters are energy conservation because no energy is exhausted through flue openings, and therefore generally lower operating costs for consumers who wish to purchase these now safer products. The Commission anticipates that ODS-equipped unvented gas-fired space heaters will be available on the market by the 1981 heating season because manufacturers of this product, their trade associations and related testing laboratories are actively engaged in expediting application of ODS systems to their products.

(j) *Conclusion.* In considering the anticipated costs of equipping unvented gas-fired space heaters with ODS systems, discussed in paragraph (f) of this section, the Commission concluded that they are not substantial when weighted against the gravity of the harm from unvented gas-fired space heaters not so equipped. Because CO is colorless and odorless as well as toxic, individuals can be unknowingly exposed; these characteristics present extreme danger during sleeping hours. Therefore, the Commission preliminarily determines that the hazards of CO poisoning associated with unvented gas-fired space heaters present an unreasonable risk of injury to the public. On the basis that unvented gas-fired space heaters continue to be manufactured, notwithstanding this hazard, the Commission also concludes that a standard requiring such products to be equipped with ODS systems is reasonably necessary to eliminate or reduce the unreasonable risk, and that the proposed standard is in the public interest.

Subpart B—Certification

§ 1212.20 Purpose of Subpart B.

The purpose of this Subpart B is to establish requirements that manufacturers and importers must follow to certify that their products comply with the requirements in Subpart A. This Subpart B includes testing, certification labeling and recordkeeping requirements.

§ 1212.21 Certification based on testing.

(a) *Requirements.* Certification by manufacturers and importers, as described in § 1212.22 shall be based either on a test of each individual unvented gas-fired space heater equipped with an ODS system or on a reasonable testing program.

(b) *Reasonable testing program.* A reasonable testing program for unvented gas-fired space heaters equipped with ODS systems is one which provides reasonable assurance that the products comply with the standard. Manufacturers and importers may establish their own reasonable testing programs. At the option of the manufacturer or importer the reasonable testing program may be performed by an independent third party qualified to conduct such testing programs.

§ 1212.22 Certification of compliance.

(a) *Certification requirements for manufacturers.* Manufacturers shall issue a certification of compliance for unvented gas-fired space heaters that are subject to the standard in the form of a lable that is permanently affixed to the heater and can reasonably be expected to last for the lifetime of the product. Such labeling shall be considered a certificate of compliance as that term is used in section 14 of the CPSA.

(1) *Placement of the certification.* The certification required by this section shall be placed at the end of the permanent plate marking label described in § 1212.8(a).

(2) *Contents of label certification.*

(i) The certification required by this section shall be visible and legible to the ultimate consumer and contain the following information:

(A) the statement, "Meets CPSC requirements for oxygen depletion safety shutoff systems";

(B) the name of the person or firm issuing the certificate, unless permanently affixed elsewhere on the heater in a place easily visible to the consumer; and

(C) the month, year, and place of manufacture.

(ii) The information required in paragraph (a)(2)(i)(B) of this section may be in code when the product bears a private label provided the code mark permits the seller of such a product to identify the manufacturer thereof to the purchaser upon his request.

(iii) The information required in paragraph (a)(2)(i)(C) of this section may be in code provided the person or firm issuing the certificate retains a written record of the meaning of each symbol used in the code that can be made available upon request by consumers, persons in the distribution chain and CPSC.

(b) *Certification requirements for importers.* The importer of any unvented gas-fired space heater that is subject to the standard must issue the certificate of compliance required by section 14(a) of the CPSA and paragraph (a) of this section. If the testing or reasonable testing program required by § 1212.21(b) of this section has been performed by or for the overseas manufacturer of the heater, the importer may rely on any such tests to support the certificate of compliance if the importer is a resident of the United States or has a resident agent in the U.S. and the records are maintained in the United States in accordance with § 1212.23. The importer bears responsibility for assuring that all testing required to support the certificate of compliance has been performed properly with passing or acceptable results and that all records of such tests are accurate and complete.

§ 1212.23 Records.

Every person issuing certificates of compliance for heaters subject to this standard is responsible for maintaining records of tests or testing programs that are the basis for the certification of compliance, whether the tests are performed by the person issuing the certificate of compliance or an independent laboratory. The records shall describe the test the heaters have been subjected to and the test results. The records shall also identify the heater or group of heaters that are certified as a result of the test data and establish that the heaters which are being marketed and certified to comply with the standard, are identical in every respect that relates to compliance with the standard, to the heaters that were tested for conformance with the standard. The records may be in any format that clearly provides this information. Records shall be maintained for a period of at least three years and shall be made available to CPSC for inspection upon request by a CPSC officer or employee, in accordance with section 16(b) of the CPSA (15 U.S.C. 2065(b)).

Dated: January 9, 1980.

Sadye E. Dunn,

Secretary, Consumer Product Safety Commission.

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Tab H—Staff Memoranda on Certification and Enforcement Strategy.

H–1 Certification Requirements for Unvented Gas-fired Space Heaters, September 21, 1979, Jones, CERM/Buxbaum, CEEE.

H–2 Enforcement Strategy for Unvented Gas Space Heaters, June 5, 1979, Jones, CERM.

Tab I—Correspondence

I–1 Letter from ANSI Z 21 Committee to James Talentino, E&S, Concerning Status of Committee Actions, March 30, 1979.

I–2 Letter from AGA to Commissioner Sloan concerning AGA Certification, April 25, 1979.

I–3 Notice from AGA Laboratories to Manufacturers of Unvented Room Heaters Concerning Revisions to the ANSI Standard and Their Effective Dates, April 18, 1979.

I–4 Notice from AGA Laboratories to Manufacturers of Unvented Room Heaters Concerning the Effective Date of the Revision in ANSI Standard, August, 9, 1979.

I–5 Letter from Martin Industries to Commissioners Sloan and Pittle, Concerning Status of Martin Industry Position on Unvented Heaters, May 8, 1979.

Tab J—Logs of Meetings & Phone Conversations

J–1 Meeting between AGA, Manufacturers to Unvented Gas Heaters, Sourdillon Co. and Commission staff, March 3, 1979.

J–2 Meeting between Commissioners Sloan and Pittle and Representatives of AGA, GAMA, and Unvented Space Heater Manufacturers, April 24, 1979.

J–3 Meeting between Manufacturers of Unvented Gas Heaters, GAMA, AGA, Commission staff, August 14, 1979.

J–4 Phone Conservation between Mr. Cridland, Sourdillon Representative, and Stan Morrow, September 12, 1979.

TAB K—Staff Memorandum on Program Addressing Chronic Hazard of CO

K–1 Health Science Review of Briefing Package, July 3, 1979, Peter Preuss, HS.

K–2 Consideration of HS Comments, August 1, 1979, George Anikis, OPM.

TAB L—Addenda to American National Standard Z21.11.2—1978 for Gas-fired Room Heaters—Unvented.

TAB M—American National Standard for Gas-Fired Room Heaters—Unvented, ANSI Z21.11.2—1978.

TAB N—Sample of Labels as Drafted by Staff in Proposed Rule.

TAB O—Examples of Warning Labels and Instruction Books Currently Used by Unvented Gas Space Heater Manufacturers.

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